



THE
ROMAN AMPHITHEATRE OF
CHESTER

— VOL I —

THE PREHISTORIC AND ROMAN ARCHAEOLOGY

TONY WILMOTT AND DAN GARNER

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THE ROMAN AMPHITHEATRE OF CHESTER

VOLUME 1: THE PREHISTORIC AND ROMAN ARCHAEOLOGY



Frontispiece. Area A showing the survival of Roman archaeology after the removal of all later stratigraphy.

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Front cover: CGI reconstruction of Amphitheatre 2 from the east (by Julian Baum).
Back cover: Reconstructed CGI aerial view of Amphitheatre 2 (by Julian Baum). Reconstructed CGI view of Amphitheatre 2 from the river Dee (by Julian Baum).

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SUMMARY

The Roman amphitheatre at Chester was discovered during building works in 1929. The first excavations on the site were carried out in 1930 when plans existed to build a road across it. These plans were abandoned in 1933 following public protest. From 1957 to 1972 the northern half of the amphitheatre was extensively excavated by F H Thompson, who concluded that there were two successive amphitheatres on the site, one built entirely of timber, and a later amphitheatre built in stone. Further work in the early 2000s by Keith Matthews cast doubt on this conclusion. In 2004–2006 large scale excavations were carried out under the direction of the authors, for English Heritage and Chester City Council. This work was aimed at recovering the whole archaeological sequence from the earliest times to the present, and will be published in two volumes. This first volume covers the prehistoric and Roman archaeology. Volume 2 will address the post-Roman archaeology.

The earliest occupation on the site is represented by a small pit and a scatter of lithics dating to the Mesolithic period. That the location was visited in the Neolithic and early Bronze Age is demonstrated by the presence of a very few lithics of these periods. The first evidence for habitation, and the earliest evidence for permanent settlement in Chester, dated to the Middle Iron Age, and consisted of a round house and a four-post building. The post-holes of the latter structure contained carbonised plant material yielding radiocarbon dates of 400–200 Cal BC. The settlement of which these structures were a part was abandoned, and the site turned over to the plough. Ploughing produced ridge-and-furrow earthworks, which were buried by the seating bank of the first amphitheatre. These earthworks preserve the landscape which the Roman legions encountered on their arrival at Chester.

The first amphitheatre was constructed in the early 70s AD during the time in garrison of Legion *II Adiutrix*. It was surveyed as an oval constructed of the arcs of four circles. The outer wall was built first, then the arena was excavated, and the spoil thrown up against the wall in order to create a seating bank. The arena wall was then built. This structure had two principal entrances into the arena, on the ends of the long axis of the building. Although there is evidence to suggest that the amphitheatre in its first phase (Amphitheatre 1a) was used, it may not have been finished.

In the later first century (c AD 85–100) it was remodelled (Amphitheatre 1b). At least one external stairway was built, allowing access into the rear seats over the outer wall. Adjacent to the north entrance a small chamber, identified as a *Nemeseum* by an altar to Nemesis discovered *in situ*, was built. A timber seating framework was installed. Details of this framework were preserved as ‘casts’, and the structure and jointing methods employed were recovered. The base-plates and lower parts of the framework were sealed and held in place by dumped material. This varied between clean red sand, probably obtained by deepening the arena, and material imported from elsewhere in the settlement. The imported material contained a wealth of artefacts and food remains, and comprised a well dated assemblage of resources available in the fort and *canabae* in the first 30 years of Roman occupation. Of particular importance was the fish bone assemblage, which is the largest single group from Roman Britain. Dating evidence suggests that Amphitheatre 1b was the work of a new garrison, Legion *XX Valeria Victrix*, and it is possible that the dumped material in the seating bank represents the debris from site clearance during the change of garrison.

A narrow band of stratigraphy around Amphitheatre 1b is unique in providing evidence for the behaviour of spectators, and for the logistics of the spectacles. Evidence survived for sequences of short-lived structures, probably stalls, and it is argued that these sold souvenirs and snack food during events. It is likely that chicken was the snack food of choice. Large dumps of clean yellow sand were delivered to the site in order to surface the arena. Several successive dumps were defined. A small stone structure with a painted interior may have been a shrine.

The second amphitheatre was built concentrically around the first, using the same survey methods. The use of the same centres as used for the first building suggests that plans had been kept in an archive. This was a much grander building. The two entrances at the ends of the long axes were retained, but the eastern side of the arena was remodelled in order to insert a principal entrance at the eastern end of the short axis. This elaborate entrance consisted of a central ramp into the arena flanked by two level passages from the street outside to the *podium*. Topographical factors precluded such an entrance on

the west side. Between each major entrance were two *vomitoria* comprising stairs leading from the street up to the *praecintio*. The remarkable survival of two steps in one of the *vomitoria* allowed the slope of the steps to be calculated. This in turn formed the basis for the mathematical and geometrical reconstruction of the entire structure which is illustrated in the CGI images in the report. The outer façade of the building was ornamented by plain pilasters, two of which were positioned between each pair of entrances. In the centre of the arena was a large stone block with an iron fitting leaded into the surface. This was probably a tethering block for use in securing animals during wild beast spectacles or *venatores*.

The date of the second amphitheatre remains a problem because of the lack of direct archaeological evidence. However, the evidence for major reconstruction works within the fortress in the early third century suggests that this may have been the date of construction. Previous excavations showed that a deposit of dark earth developed in the arena, over which patchy stone surfaces were laid.

Dating evidence indicates that this soil deposit dated to the late third century, and this appears to have been the end date for the amphitheatre.

This volume ends with this final phase. However, the amphitheatre survived as a major determining factor for the development of this part of post-Roman Chester. In particular, post holes and other features provided evidence for seven phases of early post-Roman occupation within the arena. Radiocarbon dates place the fourth of these phases into the Middle Saxon period. The traditional foundation date of the adjacent church of St John is in the late 7th century. This date, the occupation in the arena, and major post-Roman alterations to the east entrance of the amphitheatre, including the insertion of massive stone walls, all raise fascinating issues concerning the relationship between the amphitheatre and the church in the Anglo-Saxon period. These issues, and the later history of the site, up to the present will be explored in the second volume of this report.

RÉSUMÉ

L'amphithéâtre romain de Chester fut découvert au cours de travaux de construction en 1929. Les premières fouilles sur le site furent menées en 1930, date à laquelle existait un projet de construction d'une route qui le traverserait. Ce projet fut abandonné en 1933 suite à l'opposition de la population. De 1957 à 1972 F. H. Thompson dirigea des fouilles extensives sur la moitié nord de l'amphithéâtre et en tira la conclusion que deux amphithéâtres s'étaient succédés sur le site, l'un construit entièrement en bois, et un amphithéâtre plus tardif construit en pierre. Au début des années 2000 de nouveaux travaux de Keith Matthews jetèrent un doute sur cette conclusion. En 2004–2006 des fouilles sur une grande échelle furent effectuées sous la direction des auteurs du présent ouvrage pour English Heritage et la municipalité de Chester. Ces travaux avaient pour but de recouvrer la séquence archéologique complète, des temps les plus anciens jusqu'au présent, et seront publiés en deux volumes. Ce premier volume couvre l'archéologie préhistorique et romaine. Le volume 2 traitera de l'archéologie post-romaine.

La plus ancienne occupation du site est représentée par une petite fosse et des lithiques éparpillés datant de la période mésolithique. La présence d'un tout petit nombre de lithiques de ces périodes démontre que le lieu était fréquenté au néolithique et à l'âge du bronze ancien. Le premier témoignage d'habitation, et le plus ancien témoignage d'occupation permanente à Chester datait du milieu de l'âge du fer et consistait en une maison ronde et un bâtiment à quatre poteaux. Les trous de poteaux de cette dernière structure contenaient de la matière végétale carbonisée qui a donné des datations au C¹⁴ de 400–200 av. J.-C. cal. Le camp dont ces structures faisaient partie fut abandonné et le site labouré. Les labours produisirent des levées de terre en sillons et billons qui furent ensevelies sous le talus des gradins du premier amphithéâtre. Ces levées de terre préservent le paysage que les légions romaines ont rencontré à leur arrivée à Chester.

Le premier amphithéâtre fut construit au début des années 70 ap. J.-C., alors que la garnison était occupée par la légion *II Adiutrix*. L'arpentage le révèle comme étant un oval formé des arcs de quatre cercles. Le mur extérieur fut construit en premier, puis l'arène fut creusée et les terres d'excavation rejetées contre le mur de manière à créer un

talus sur lequel s'asseoir. C'est alors que le mur de l'arène fut construit. Cette structure avait deux entrées principales pour accéder à l'arène, à chaque extrémité de l'axe de la longueur du bâtiment. Bien que des indices donnent à penser que l'amphithéâtre fut utilisé au stade de sa première phase (Amphithéâtre 1a), il se peut qu'il n'ait jamais été terminé.

Dans la seconde partie du premier siècle (vers. 85–100 ap. J.-C.) il fut remodelé (Amphithéâtre 1b). On construisit au moins un escalier extérieur, permettant l'accès aux sièges de l'arrière par-dessus le mur extérieur. Contigue à l'entrée nord, fut construite une petite pièce, identifiée comme un *Nemeseum* grâce à un autel à Nemesis découvert *in situ*. Une ossature de sièges en bois fut installée. Les détails de cette ossature furent préservés sous forme de 'moulages' et la structure et les méthodes de jointures employées furent recouvrées. Les soles et les parties basses de l'ossature furent scellées et maintenues en place par des matériaux rejetés. Ceux-ci allaient d'un sable rouge propre, probablement obtenu en approfondissant l'arène et des matériaux importés d'ailleurs dans le camp. Les matériaux importés contenaient une quantité d'objets manufacturés et de restes de nourriture et comprenaient un assemblage précisément daté de ressources disponibles dans le fort et les *canabae* pendant les 30 premières années de l'occupation romaine. Particulièrement important était l'assemblage d'arêtes de poisson qui est le plus grand groupe individuel de la Grande-Bretagne romaine. Des témoignages de datation donnent à penser que l'Amphithéâtre 1b était l'oeuvre d'une nouvelle garnison, la légion *XX Valeria Victrix*, et il se peut que les matériaux rejetés dans le talus des gradins représentent les débris du déblayage du site pendant le changement de garnison.

Une étroite bande de stratigraphie autour d'Amphithéâtre 1b est unique en ce qu'elle apporte des témoignages du comportement des spectateurs et de la logistique des spectacles. Des témoignages de séquences de structures de courte durée, probablement des étals, ont survécu et nous argumentons qu'on y vendait des souvenirs et des collations pendant les événements. Il est probable que le poulet était le met préféré. De grands dépôts de sable jaune propre furent livrés sur le site pour revêtir l'arène. Plusieurs dépôts successifs furent définis. Une petite structure en pierre avec un intérieur peint était peut-être un autel.

Le second amphithéâtre fut construit concentriquement autour du premier, utilisant les mêmes méthodes d'arpentage. L'utilisation des mêmes centres que ceux utilisés pour le premier bâtiment donne à penser que des plans avaient été conservés dans les archives. Celui-ci était un bâtiment bien plus imposant. Les deux entrées à l'extrémité des longs axes furent conservées, mais le côté est de l'arène fut modifié de manière à y insérer une entrée principale à l'extrémité est du petit axe. Cette entrée élaborée consistait en une rampe centrale d'accès à l'arène flanquée de deux passages de niveau allant de la rue à l'extérieur au *podium*. Des facteurs topographiques excluaient une telle entrée du côté ouest. Entre chaque entrée majeure se trouvaient deux *vomitaria* comprenant un escalier montant de la rue au *praecintio*. La remarquable survivance de deux marches dans un des *vomitaria* a permis de calculer la pente de l'escalier. Ce qui, à son tour, a servi de base pour la reconstruction mathématique et géométrique de la totalité de la structure qui est illustrée dans les images générées par ordinateur du rapport. La façade extérieure du bâtiment était ornée de simples pilastres, dont deux étaient positionnés entre chaque paire d'entrées. Au centre de l'arène se trouvait un gros bloc de pierre avec une ferrure soudée dans la surface. C'était probablement un bloc pour attacher les animaux pendant les spectacles de chasse aux fauves ou *venatores*.

La date du second amphithéâtre demeure un problème à cause du manque de témoignages archéologiques

directs. Toutefois, des témoignages d'importants travaux de reconstruction à l'intérieur de la forteresse au début du troisième siècle donnent à penser que ceci aurait pu être la date de sa construction. Des excavations antérieures ont montré que s'était constitué dans l'arène un dépôt de terre sombre, sur lequel des surfaces de pierre inégales avaient été posées. Les témoignages de datation indiquent que cet apport de sol datait de la fin du troisième siècle, et cela semble avoir été la date de la fin de l'amphithéâtre.

Ce volume se termine sur cette phase finale. Néanmoins l'amphithéâtre a survécu en tant qu'important facteur déterminant dans le développement de cette partie du Chester post-romain. Les trous de poteaux et autres indices ont en particulier fourni des témoignages pour sept phases d'occupation du début de la période post-romaine à l'intérieur de l'arène. Des datations au C^{14} situent la quatrième de ces phases à la période saxonne moyenne. La traditionnelle date de la fondation de l'église St John adjacente se situe vers la fin du 7^{ème} siècle. Cette date, l'occupation de l'arène et les importantes modifications post-romaines de l'entrée est de l'amphithéâtre, y compris l'insertion de massifs murs de pierre soulèvent toutes de fascinantes questions concernant les relations entre l'amphithéâtre et l'église à la période anglo-saxonne. Ces questions, et l'histoire plus tardive du site, jusqu'à nos jours, seront explorées dans le second volume de ce rapport.

ZUSAMMENFASSUNG

Das römische Amphitheater von Chester wurde 1929 bei Bauarbeiten entdeckt. Die ersten Ausgrabungen fanden hier 1930 statt, als es Pläne gab, eine Straße über den Fundort zu bauen. Aufgrund öffentlichen Widerstands wurden diese Pläne aber 1933 wieder aufgegeben. Von 1957 bis 1972 wurde die nördliche Hälfte des Amphitheaters von F. H. Thompson großflächig ausgegraben. Er kam zu dem Schluss, dass sich auf dem Fundplatz zwei Amphitheater befanden: ein gänzlich in Holz Errichtetes und ein späteres, das in Stein gebaut wurde. Nachfolgende Untersuchung, die von Keith Matthews in den frühen 2000er Jahren durchgeführt wurden, ließen jedoch Zweifel an dieser Interpretation aufkommen. Von 2004 bis 2006 wurden unter der Leitung der Autoren, für English Heritage und die Stadtarchäologie Chester, großmaßstäbige Ausgrabungen durchgeführt. Ziel dieser Maßnahmen, die in zwei Bänden publiziert werden, war es, die gesamte archäologische Schichtenfolge von den frühesten Anfängen bis in die Gegenwart zu untersuchen. Im ersten Band werden die Ergebnisse zur urgeschichtlichen und römischen Archäologie vorgelegt; der zweite Band behandelt die Archäologie der nachrömischen Perioden.

Die frühesten Hinweise menschlicher Anwesenheit sind eine kleine Grube und eine Flintstreuung, die in das Mesolithikum datieren. Dass die Örtlichkeit während des Neolithikums und der frühen Bronzezeit aufgesucht wurde, lässt sich anhand einiger weniger Flintartefakte dieser Perioden belegen. Der erste Beleg für Besiedlung, und der früheste Beleg für eine dauerhafte Siedlung in Chester überhaupt, in Form eines Rundhauses und eines Vier-Pfosten Gebäudes, datiert in die mittlere Vorrömische Eisenzeit. Die Pfostenlöcher des letztgenannten Gebäudes enthielten verkohlte Pflanzenreste, die Radiokarbondatierungen aus dem Zeitraum zwischen 400 und 200 v. Chr. lieferten. Die Siedlung, zu der diese Strukturen gehörten, wurde aufgegeben und überpflügt. Durch das Pflügen wurde eine Wölbackerstruktur geschaffen, die von den Rängen des ersten Amphitheaters überlagert wurden. Diese Struktur gehört zu der Landschaft, die die römischen Legionen bei ihrer Ankunft in Chester antrafen.

Das erste Amphitheater wurde in den frühen 70iger Jahren des 1. Jahrhunderts n. Chr. während der Stationierung der *legio II Adiutrix* errichtet. Sein Grundriss wurde in Form eines aus vier Kreisbögen konstruierten Ovals angelegt.

Es wurde zuerst die Außenwand gebaut, dann die Arena ausgegraben und der Abraum entlang der Wand aufgehäuft, um so die Ränge zu errichten. Als nächstes wurde die Wand der Arena gebaut. Diese Struktur umfasste zwei Haupteingänge in die Arena, die sich an den Enden der Längsachse des Gebäudes befanden. Obwohl es Hinweise auf die Nutzung des Amphitheaters bereits in seiner ersten Bauphase (Amphitheater 1a) gibt, ist es möglich, dass der Bau dieser Phase nie vollendet wurde.

Ein Umbau (Amphitheater 1b) erfolgte im späteren 1. Jahrhundert (ca. 85–100 n. Chr.). Es wurde mindestens eine Außentreppe errichtet, die über die Außenwand Zugang zu den hinteren Sitzreihen gewährte. Unmittelbar neben dem nördlichen Eingang wurde ein kleiner Raum gebaut, der aufgrund eines sich noch in situ befindlichen, der Göttin Nemesis geweihten Altars als *Nemeseum* identifiziert werden kann. Ein Gerüst für hölzerne Sitzreihen wurde eingebaut. Details dieses Gerüsts haben sich als Abdrücke erhalten, und die zur Anwendung gekommenen Gefüge- und Holzverbindungen konnten untersucht werden. Das Fundament und die unteren Bereiche des Gerüsts wurden durch den Abraum abgeschlossen und in ihrer Lage fixiert. Der Abraum variierte zwischen sauberem, rotem Sand, der wahrscheinlich vom Aushub der Arena stammt, und aus anderen Bereichen der Siedlung herangeschafftem Material. Dieses Material war reich an Fundmaterial und Essensresten und enthielt eine gut-datierte Sammlung von Ressourcen, die im Lager und seinen *canabae* während der ersten 30 Jahre der römischen Besiedlung erhältlich waren. Von besonderer Bedeutung waren die Fischgräten, die den größten derartigen Komplex aus dem römischen Britannien darstellen. Aufgrund des datierbaren Materials ist es wahrscheinlich, dass das Amphitheater 1b das Werk einer neuen Lagerbesatzung – der *legio XX Valeria Victrix* – war. Möglicherweise stammt der Abraum im Bereich der Ränge vom Schutt der Räumung im Zuge des Wechsels der Lagerbesatzung.

Eine dünne Schicht der Stratigrafie um das Amphitheater 1b liefert einzigartige Hinweise auf das Verhalten der Zuschauer und die Logistik der Spektakel. So fanden sich Spuren einer Abfolge kurzlebiger Strukturen, wahrscheinlich Verkaufsstände, und es wird argumentiert, dass hier während der Darbietungen Souvenirs und Snacks

verkauft wurden. Hühnchen scheint der Snack der Wahl gewesen zu sein. Große Mengen von sauberem, gelbem Sand wurden als Schüttung für die Arena zum Fundort geliefert. Es ließen sich mehrere aufeinanderfolgende Schüttungen unterscheiden. Bei einem kleinen Steinbau mit ausgemaltem Innenraum könnte es sich um einen Schrein handeln.

Das zweite Amphitheater wurde konzentrisch um das Erste herum errichtet, wobei der Grundriss mit den gleichen Vermessungsmethoden bestimmt wurde. Die Nutzung derselben zentralen Messpunkte wie beim Bau des ersten Amphitheaters legt nahe, dass die Pläne in einem Archiv aufbewahrt worden waren. Der Neubau war wesentlich prächtiger. Die beiden Eingänge an den Enden der Längsachse blieben bestehen, aber die Ostseite der Arena wurde umgestaltet, um Platz für einen Haupteingang am Ostende der Querachse zu schaffen. Dieser aufwendige Eingang bestand aus einer zentralen, in die Arena führenden Rampe, die von zwei ebenerdigen Passagen flankiert wurde, die von der Straßenseite zum *podium* führten. Aufgrund der topografischen Gegebenheiten war ein solcher Eingang an der Westseite nicht möglich. Zwischen den Haupteingängen befanden sich jeweils zwei *vomitoria*, in denen Treppenaufgänge von der Straße zur *praecinctio* hinaufführten. Die außergewöhnliche Erhaltung von zwei Stufen in einem der *vomitoria* ermöglichte es, die Neigung der Treppe zu ermitteln. Dies wiederum bildete den Ausgangspunkt für die mathematische und geometrische Rekonstruktion der gesamten Baustruktur, die in den CGI-Darstellungen in diesem Band dargestellt werden. Die Außenfassade des Gebäudes war mit schlichten Pilastern verziert, von denen sich jeweils zwei zwischen jedem Eingangspaar befanden. In der Mitte der Arena befand sich ein Steinblock, in den ein mit Blei gesicherter

Eisenbeschlag eingelassen war. Dies war wahrscheinlich ein Block zum Anbinden von wilden Tieren während der Tierspektakel oder *venationes*.

Aufgrund des Mangels an unmittelbaren archäologischen Belegen ist die Datierung des zweiten Amphitheaters weiterhin problematisch. Allerdings legen die Hinweise auf umfangreiche Umbauarbeiten im Kastellbereich während des frühen 3. Jahrhunderts nahe, dass der Bau in diesem Zeitraum durchgeführt worden sein könnte. Vorangegangene Ausgrabungen haben gezeigt, dass sich in der Arena eine (humose) „dark earth“ Schicht gebildet hat, über die lückenhafte Steinpflaster gelegt wurden. Diese Bodenablagerungen lassen sich in das späte 3. Jahrhundert datieren, und dies scheint auch die Schlussdatierung für das Amphitheater zu sein.

Diese Schlussphase bildet den Abschluss des Bandes. Für die Entwicklung dieses Bereichs des nach-römischen Chester blieb das Amphitheater jedoch weiterhin ein prägender Faktor. Hinweise auf sieben Phasen früher nachrömischer Besiedlung innerhalb der Arena fanden sich insbesondere in der Form von Pfostenlöchern und anderen Befunden. Anhand von Radiokarbondatierungen konnte die vierte dieser Phasen in die mittlere angelsächsische Zeit datiert werden. Das traditionelle Gründungsdatum für die unmittelbar benachbarte St. John Kirche liegt im späten 7. Jahrhundert. Dieses Datum, die Besiedlung der Arena und die umfangreichen nachrömischen Umbauten des Osteingangs des Amphitheaters – u. a. der Einbau massiver Steinwände – werfen interessante Fragen zur Beziehung zwischen dem Amphitheater und der Kirche während der angelsächsischen Zeit auf. Diese Fragen, und die nachfolgende Geschichte des Fundplatzes bis in die Gegenwart, werden im zweiten Band dieses Berichts untersucht.

Translation: Jörn Schuster,
ARCHÆOLOGICALsmallFINDS

PART 1

INTRODUCTION

The city of Chester is situated in the north-west of England in the historic county of Cheshire. It lies on the river Dee, very close to the modern border with Wales (Fig 1) (SJ 4085 6614). It originated in the establishment of the Roman legionary fortress of *Deva*, and has remained a key location in the north-west of England ever since, constituting the region's principal sea port prior to the emergence of Liverpool in the later 17th century.

THE SITE: GEOLOGY AND TOPOGRAPHY

The city occupies a ridge of the Permo-Triassic sandstone known as the Chester Pebble Beds, which protrudes through thick glacial drift deposits (Fig 2). The ridge runs from Heronbridge in the south, through Handbridge, to the site of the Roman legionary fortress and subsequent walled city (Hebblethwaite 1987, 4; Mason 1976). The



Fig 1 Location map of Chester in (a) Roman Britain and (b) Roman Cheshire and area.

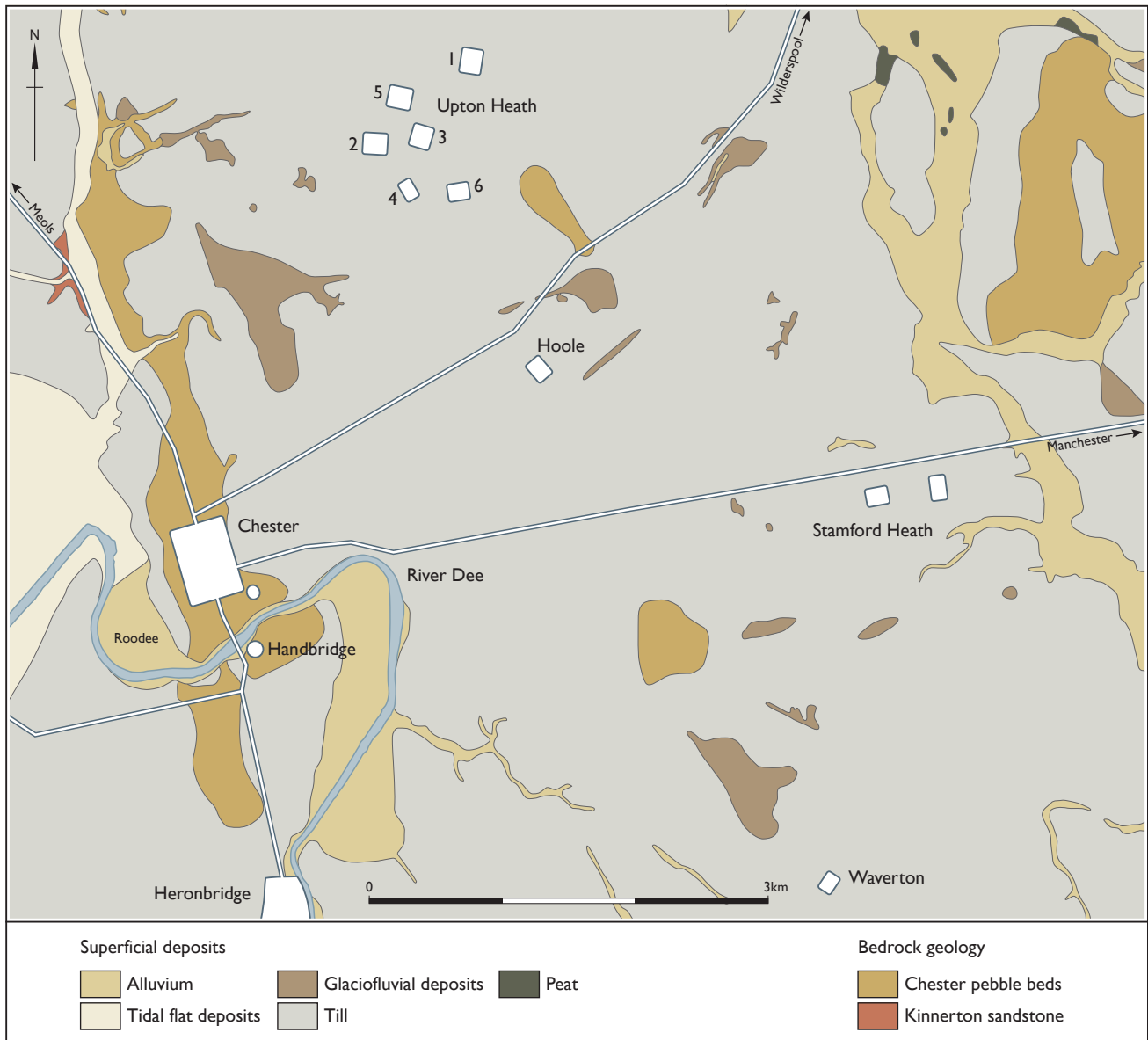


Fig 2 Chester and the surrounding Roman 'temporary camps' (Upton Heath (numbered 1–6), Hoole, Waverton), the settlement of Heronbridge and the Roman road network against the regional solid and superficial geology (after British Geological Survey)..

river Dee reaches Chester from the south, bending sharply westwards to cut a narrow gorge through the ridge between Chester to the north and Handbridge on the southern bank. The legionary fortress and its associated amphitheatre occupy the top of the ridge to the north of the river. From the gorge the river originally swung northwards along the western foot of the ridge into a broad estuary, the original banks of which are today marked by the line of the medieval city wall to the east and Curzon Park to the west. The area at the head of the estuary would have provided a secure anchorage in Roman times. The river used to be tidal at least as far as Chester, and occasionally further upstream (Coward 1910, xiii), and in the Roman period it was likely that substantial vessels could easily

reach Chester (Halcrow Group Ltd 2013). The dynamic processes of sea-level change and silting have radically altered the river, and since the 4th century the flat alluvial plain known as the Roodee (which is today occupied by Chester racecourse) has formed (for the most recent assessment of the development of the river see Ward, S 2012). The Roodee is a likely candidate for a Roman harbour, with substantial structural remains of Roman date uncovered there (Mason 1987, 153).

The sandstone ridge is nowhere more than 1 km in width, and glacial till lies against its eastern flanks. Evaluation work to the south of the amphitheatre (Buxton 1993, 165) showed natural deposits of horizontally bedded, clean, brownish yellow sand. These sloped

sharply towards the river. Though the excavator suggested that artificial terracing had taken place in the past, such a conclusion should be treated with caution due to the existence of a series of natural river terraces of late Pleistocene date cut into this material (Earp and Taylor 1986, 80), and it is more likely that this observation is of a natural river terrace of this date at around the 16.5–17 m OD contour (p 29).

The Pebble Bed formation comprises medium-to coarse-grained reddish brown sandstone, incorporating characteristic rounded pebbles. In its well-cemented form it is durable enough to have been used as building stone (Earp and Taylor 1986, 16–18, 86). Stone quarries in the Dee gorge below the amphitheatre were exploited in the medieval period, but were also worked to obtain stone for Roman construction (Strahan 1882, 3–9). This is the likely source for all stone used in the construction of the amphitheatre and later structures in the vicinity.

Another geological resource utilised at the amphitheatre should be mentioned. A fine yellow sand appears to have been imported in quantity for use in the arena (p 159). The origin of this material is not known, but it differs from the deposits noted in the river bank exposures. In the Chester area fluvioglacial sand deposits appear as surface exposures where they are not capped by overlying till, or in deep valleys where exposures occur in the edges. This material may therefore have come from surface exposures such as those at Upton Heath, Waverton and Hoole (Earp and Taylor 1986, 72), in all of which locations Roman temporary camps have been found (Fig 2; Philpott 1998).

The legionary fortress of *Deva* was sited at the highest navigable point of the river Dee, which was also its lowest fordable crossing point. The Roman bridge from Chester to Handbridge joined the two outcrops of the Pebble Beds through which the river cut. The fortress occupied a slight plateau broadly within the 25 m contour line on the top of the south-facing slope towards the river. Mason (2012, 48) points out that the southern defences of the fortress were enhanced by being located between two natural defiles, a deep one to the south-west, and to the south-east a 'lesser' feature (Figs 3, 4). The latter is, nonetheless, a pronounced steeply sloping natural cleft in the sandstone bedrock, and is now occupied by the thoroughfare known as Souters Lane (Fig 7). The defile has been both widened and deepened in the post-medieval period, and subsequently narrowed by the encroachment of buildings, particularly on its eastern side, however it was clearly a substantial natural feature (p 29). The amphitheatre is situated immediately to the south-east of the south-east corner of the legionary fortress. It sits close to the edge of the 20 m contour on the edge of the slope down to the river, occupying a plateau on the eastern side of the Souters Lane ravine.

THE ARCHAEOLOGY OF ROMAN CHESTER

The interpretation of the archaeology of the amphitheatre is closely tied to the chronology of occupation of the legionary fortress of *Deva* which it served. The following framework is provided to tie the archaeology of the amphitheatre into the general story of Roman Chester as currently understood.

Pre-Roman activity

There was very little evidence for pre-Roman activity in Chester prior to the excavation of the amphitheatre. Some evidence of pre-Roman agriculture in the shape of plough marks in the sandstone bedrock was found in Frodsham Street in 1966 (Petch 1996, 71, fig 15), sealed beneath the Roman parade ground (for discussion see p 69; Fig 43).

Military occupation before the fortress

There has long been speculation that Roman military activity pre-dated the establishment of the legionary fortress at Chester. Watkin (1886, 87, 214) recorded cremation burials within the eastern *retentura*, that ought to have related to an earlier establishment owing to the well-known prohibition on burial within inhabited boundaries. One of the cremation urns was apparently of Neronian date (Mason 2012, 35). Other apparent stratigraphic or structural evidence for pre-Flavian activity, for example at Goss Street and on Abbey Green (McPeake 1978) is now considered to have related to the earliest phases of the fortress. No such explanation is possible, however, for a ditch, a beam-slot and post-holes found beneath the so-called Elliptical Building (Fig 3: Mason 2000a, 8–12, ill 10; Mason 2012, 36). The preliminary interpretation of these features is that they represent two possible pre-fortress phases, one being a temporary camp, the other a more permanent installation. These features produced no dating evidence beyond their stratigraphic position beneath the primary buildings of the legionary fortress. It is possible that these features are prehistoric in date (for discussion see p 70). If Roman, this early activity may have been pre-Flavian, though this is unlikely, as pre-Flavian pottery from Chester is no more frequent than might be expected on an early Flavian site (Carrington 1985, 18), and the coinage from the site similarly does not substantiate pre-Flavian Roman activity (Shotter 1999).

The military situation in the midlands and the north following the Brigantian 'revolt' and the rescue of Cartimandua in AD 69 will have occasioned a great deal of troop movement prior to the establishment of permanent bases. Petillius Cerialis, who arrived in AD 71 with Legion *II Adiutrix*, certainly penetrated as far as the Solway, as demonstrated by the dendrochronological date of AD 72/73 for the felling of the timbers for the first fort at Carlisle (Zant 2009, 7). Numismatic evidence suggests his advance

further, into Scotland, and is also consistent with the idea of occupation at Chester in the early 70s (Shotter 1999, 28). Given the nature of campaigning however, it is by no means certain that such an occupation took the form of a legionary base. It is likely that military activity at Chester was episodic and conceivably associated with a number of temporary installations, and this is a feasible context for the early evidence beneath the Elliptical Building. It may also be the context for the inscribed ingots of Flintshire lead, dated to AD 74 that have been found in Chester (RIB II, 2404.31–8). These have been taken either to indicate the existence of an early fort associated with the imperial exploitation of Welsh lead resources, or to provide a date of construction for the legionary fortress (Mason 2012, 32).

Chester was an important strategic location for the northward and westward expansion of Roman arms under the Flavian governors. It cut off any communication between the Brigantes in the north of England and the north Welsh tribes, notably the Ordovices. The site itself was perfect as it combined a major military base with an excellent harbour. Its position at the highest navigable point of the river, where the Dee opened up into a secluded anchorage, made it an ideal base for combined army and naval operations both into *Brigantia* and Ordovician territory. The rapid narrowing of the river at this point also enabled the river to be bridged for easy land access into north Wales.

The construction of the fortress

Conventional wisdom would hold that the fortress was founded in the 70s by Legion *II Adiutrix*, which formed its first garrison, and this view is held by Malone (2006, 46–7). Mason (2000a, 167–76) has tentatively suggested that the fortress was founded by Legion *XX Valeria Victrix* and replaced by *II Adiutrix* when the Twentieth campaigned in the north under Agricola. In this model, *XX Valeria Victrix*, withdrawn from their presumed base at Inchtuthil, would replace *II Adiutrix* at Chester on the departure of that legion for the Danube. The most recent rehearsal of these arguments is by Carrington (2012a, 342–43). Whichever legion was responsible for the initiation of construction, it is clear both that *II Adiutrix* was the early garrison and that Chester became the permanent base of *XX Valeria Victrix*, probably on the abandonment of Inchtuthil, the date of which is placed by Pitts and St Joseph (1986, 279) in AD 86–87. At the same time numismatic evidence indicates the departure of any holding or administrative garrison at the legion's previous main base at Wroxeter (Malone 2006, 47).

The new fortress of *Deva* was built on a sloping site on the sandstone ridge from where it could command the Dee bridge, and where an efficient water supply and drainage system could be installed (Mason 2012, 48). The primary defences consisted of an earthen rampart revetted with laid turves and timber strapping. Timber angle- and interval-towers were provided and the gates were also of timber

construction. The primary *principia* and early barracks were timber built, utilising a post-in-trench construction method (Mason 2012, 65–68). The main baths and *horrea* were built in stone, however, as were a group of buildings in the centre of the fortress which require further comment (Fig 3).

It has long been recognised that the fortress was of exceptionally large size. Although the width of the fortress was similar to that of the other permanent British fortresses at York and Caerleon, its length was significantly greater, giving a total intramural area of 24.65ha – 20% larger than the other two fortresses (Mason 2000a, 13). The reason for this is now understood to be the provision of a suite of exceptional structures within the area of the *latera praetorii* and the *retentura* of the fortress. In 1968 excavations on the Old Market Hall site (Petch 1968) began to investigate the building in the *insula* behind the *principia*. In a series of excavations it eventually became clear that this was a massive rectangular courtyard complex measuring 160 × 65 m (Strickland 1982, 16–24). It was surrounded by ranges of rooms set around a colonnaded portico. Offset to the north of the courtyard was a long narrow building measuring 32.4 × 13.2 m, and to the south of the courtyard was a further free-standing structure divided into three rooms. It is odd that the courtyard building behind the *principia* should have been given priority in masonry construction over the *principia* itself. To the west of this remarkable complex was the still-more anomalous structure now known as the Elliptical Building. Originally discovered by Eames in the 1960s, this building is the subject of a major analytical monograph by Mason (2000a). It comprised a central elliptical courtyard surrounded by a colonnaded portico. Behind and concentric to this was a range of twelve rooms. The elliptical element was set in a rectangular frame, with rooms opening onto the colonnaded streets to east and west. In the centre of the courtyard was the foundation for a fountain which was to be supplied by lead water pipes. These (RIB II, 2434. 1–3) bear consular inscriptions dating to the early part of AD 79 and the name of Agricola.

The decidedly non-utilitarian Elliptical Building is unlikely to have been one of the first planned and it remained incomplete at the end of the Flavian period. The date of the water pipes thus suggests that the construction of the fortress was well in hand by AD 79. As far as the more normal structures within the fortress are concerned, an inscription found in the legionary bath-house that probably marks the completion and dedication of this facility (RIB I, 463) can be dated between the years AD 72 and 79 (Robinson 2005), so does not help with the fine detail of annual chronology.

The major task of rebuilding the fortress defences in stone appears to have begun before the end of the first century (Mason 2000a, 86–7; Le Quesne 1999 144–5). It is uncertain to what extent the stone defensive circuit was completed. It is possible that it was not finished until the early 3rd century following the hiatus of the 2nd century

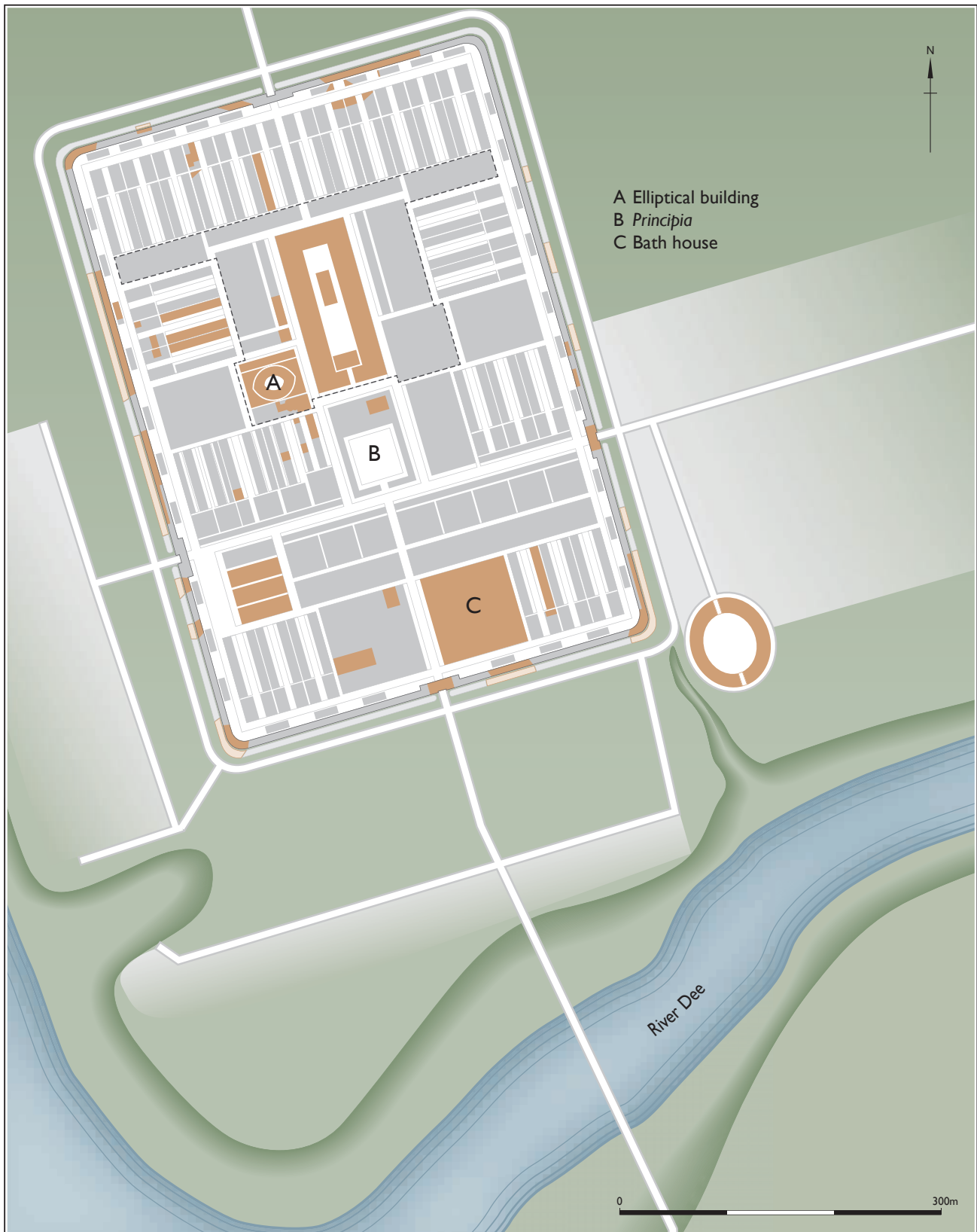


Fig 3 The fortress and amphitheatre of Chester c AD 79 (after Mason, 2012 figs 20c, 59). The central enclave area is outlined in dashed lines and the possible area of extramural settlement is highlighted (after Mason, 2012 figs 20b, 54, 59).

(below), as was the case at York (Ottaway 1996, 292–3), although Mason (2012, 138–41) considers it likely that the circuit was completed, possibly as early as the reign of Trajan, and invokes a Trajanic inscription (RIB 464) as a possible commemoration of the completion of the work. The quality of these defences, built in massive *opus quadratum* with a chamfered plinth at the base and an ornate cornice at rampart-walk level marks them out as highly unusual.

It is important to note that the anomalous group of buildings was not completed. Work on the Elliptical Building in particular ceased before all the foundations were completed (though its associated bath house was completed and used). It remained empty space, used for the dumping of industrial and other waste until the beginning of the third century and the same fate befell the *insula* (*Insula XXI*) to its immediate north (Mason 2000a, 105–7). Though the huge courtyard structure was begun in the Flavian period it, too, was left for a while, remaining unfinished until completed to a slightly different plan two decades or more later (Mason 2012, 81–82).

The elaboration of the defences, the presence of the anomalous buildings within the fortress and the abrupt cessation of their construction, together with significant epigraphic evidence have been considered by Mason (2000a, 66–95), who has proposed a convincing explanation. To summarise, he sees the structures in the centre of the fortress as an enclave designed to house the offices and staff of the provincial governor. The unique design of the monumental Elliptical Building would need the authorisation of a higher authority than the legionary legate – that of the governor – especially if, as Mason argues, the building was something in the nature of an *augusteum*, having a religious and didactic function with relation to the imperial cult and the image of the Roman world. Close to the Elliptical Building an inscription was found on the Old Market Hall site which is highly unexpected in a military context, and indeed unique so far in Britain (RIB I, 462). It is thought to be an administrative document of the Flavian-Trajanic period recording a change in the arrangements for the fortress or its governance that was of such importance that a permanent formal record was deemed desirable (Thompson 1997; Mason 2012, 104–7). The proposed enclave is outlined in Fig 3. Mason argues that the preparation of this official enclave was halted because the centre of military operations in the province moved northwards under Agricola. The basis of this argument is that the water pipes with their date of AD 79 provide a *terminus post quem* for the abandonment of the building, and the assumption that this came soon after this date, at the time of Agricola's advance into Scotland.

As already noted, the fortress probably became the base for legion *XX Valeria Victrix* after the retreat from Agricola's Scotland in AD 86–87. This appears to coincide with the rebuilding of several structures in timber, and a programme of rebuilding in stone for most buildings. Work on the *opus*

quadratum walls of the fortress was also maintained. This period also seems to mark the initiation of the extramural *canabae* on the western side of the fortress (Fig 3; Ward, S *et al* 2012, 263). While knowledge of the situation to the east of the fortress is sparse, indications are that extramural settlement began here at the same time (Carrington 2012a, 310).

The second-century hiatus

If the defences were completed in stone under Trajan this would have been one of the last major works before the hiatus of the second century. Although it is unlikely that the fortress was wholly deserted at this time, the abrupt interruption of work replacing the timber internal buildings in stone, particularly marked on the Northgate Brewery barracks site (Ward, S and Strickland 1978; Mason 2012, 162), seems to reflect the absence of many soldiers, and work here was not resumed until after *c* 160. In contrast, the period *c* 120–30 and into the mid-second century saw the reconstruction of buildings in the eastern *canabae* in stone (Ward, S *et al* 2012, 263).

There is a great deal of evidence to demonstrate that for most of the first half of the 2nd century the vast majority of the legionary personnel was not present (Strickland 1999). Detachments of the legion are attested in major construction projects and in other theatres of operation. The clearest example of this is the legion's participation together with the other two legions then in Britain, *II Augusta* from Caerleon and *VI Victrix*, based at York, in the construction of Hadrian's Wall from AD 122 onwards (Breeze and Dobson 2000, 66–83; Malone 2006, 221–34). At least part of the legion was still in the north between 128 and 138 where it was responsible for the construction of the Cumberland coastal fort at Moresby (Breeze 2006, 411). The epigraphically attested transfers of officers and centurions to the east during the Bar Kochba revolt in Judaea in 132, however, were probably individual postings, not involving the draft of vexillations (Malone 2006, 56, n 20).

During the following reign, that of Antoninus Pius, the British legions were responsible for the construction of the Antonine Wall between *c* 142 and 144. The distance slabs recording work on the Antonine Wall specify that Legions *VI* and *XX* supplied vexillations to the work, while the whole of Legion *II Augusta* was involved. Hanson and Maxwell (1983, 133–4) suggest that some 1,500–2000 men; half the strength of *XX Valeria Victrix*, would have been present. The clear implication is that half the legion was on other duties. Legionary activity on the Antonine Wall has been associated with a ceramic assemblage which includes North African vessel types (Swan 1997). A specific context for this has been sought in the career of the *primus pilus* of *XX Valeria Victrix*, one S Flavius Quietus, who commanded a force in Mauretania in 149–50, returning to command the *Classis Britannica* (Swan 1999, 423–4).

The idea that he took troops with him and returned with African replacement recruits is not, however, consistent with a usual career progression (Malone 2006, 60). In addition such pottery appears also at York (Swan 1992) and Caerleon, suggesting a general reinforcement of the British legions from Africa, possibly following this Mauretanian expedition. In short, this is not a phenomenon limited to the twentieth legion.

On the abandonment of the Antonine Wall *c.* 161, soldiers of the legion were involved in the re-commissioning of Hadrian's Wall and construction works in the Pennine forts as part of the development of military deployment in northern Britain following the withdrawal from Antonine Scotland. There is no firm evidence for large-scale reconstruction and re-occupation in the Chester fortress until the early years of the 3rd century. Epigraphic evidence shows that the legion had detachments at Corbridge, Newstead and Carlisle in the 160s. Tile stamps of the manufacturer Aulus Viducus, found on the Northgate Brewery site, may date to either 126 or 167, based upon the consular date given, but as these were not found in a securely stratified context (Malone 2006, 63), it is not possible to be sure which is the more likely.

For much of the troubled late 2nd century the legion appears to have been deployed in the north, finally participating in Clodius Albinus' disastrous expedition to claim the purple which resulted in his defeat by Septimius Severus at Lyons (*Lugdunum*) in 198 (Malone 2006, 64).

Third-century recommissioning

The British legions were returned to the Province by Severus, but the twentieth does not appear to have returned immediately to Chester. It is probable that the legion took a very active role in the campaigns into Scotland led by Severus from 208 until his death in 211 at York (Malone 2006, 65). It was only after these campaigns that the Chester fortress underwent a thorough recommissioning. This is attested (*inter alia*) by the widespread use of stamped ceramic building material giving the legion the cognomen *Anto[niniana]*, which may be translated as 'Caracalla's own' (Mason 2012, 175). The legionary fortress at Caerleon was refurbished at the same time, and similar brick stamps giving the same cognomen to *II Augusta* have been found in structures and deposits relating to the final refurbishment and construction phase in the Caerleon amphitheatre. The stamp is quite closely dateable as it would not have been used after the *damnatio memoriae* of Elagabalus in 222 (Miller 1928). These refurbishments were part of a general overhauling of the military dispositions in the north of Britain including on Hadrian's Wall (Breeze and Dobson 2000, 146), for example at Birdoswald, where epigraphic and archaeological evidence similarly attest a major building programme between *c.* 198 and 219 with repair and refurbishment continuing until the mid-230s (Wilmott 1997, 197–9).

At Chester it is also clear that the refurbishment process was underway around the time of Severus' death, but continued for several decades, with coins of Severus Alexander (222–35) being found in building foundations, including the footings of the western gable of the *principia* cross-hall (Mason 2012, 175). The fortress was virtually completely rebuilt. Buildings were renewed or repaired, and plots that had remained open since the abandonment of the Flavian structural phase were now built upon. The fortress was equipped 'with a full complement of buildings for the first time in its history' (Mason 2012, 175) (Fig 4).

One of the most significant aspects of this refurbishment was the construction, on the site originally intended, of the Elliptical Building. The original foundations for the unfinished Flavian structure had long been buried to up to a metre deep, and had disappeared from view. The 3rd-century version of the building diverged from the original plan and it is possible that it was not intended for the same purpose as its Flavian prototype (Mason 2000a, 133). Effectively it was redesigned and rebuilt *de novo*, sometimes respecting, but mostly ignoring, the original foundations. As Mason (2012, 183) points out, the construction of this building so near to the original design, and on the original site, must imply that the 3rd-century builders used the original plans for the building, which must have been retained in an archive.

There is some evidence for detachments of Legion *XX Valeria Victrix* serving on the continent in the mid-3rd century with soldiers of *II Augusta* (Malone 2006, 68). A particular indication is a 3rd-century bronze roundel (RIB II, 2427.26) of unknown provenance, but now in Paris, which depicts a group of soldiers under the *vexilla* of the two legions, watching a *venatio*. The legion was certainly active during the usurpation of Carausius and Allectus (286–296) as it appears on a number of types of Carausian legionary coinage (Williams 2000; Lyne 2003). These coins are the latest record of the legion's existence. Petch (1987, 137) suggested that the legion was disbanded by Constantius after the recovery of Britain. Matthews (2004, 17) has gone further, suggesting that the legion's support for the usurpers resulted in its suffering the execution of its senior officers, even associating a perceived refurbishment of the amphitheatre with such an event, while Clay (2004) has further argued that tombstones built into the north wall of the fortress might have been mutilated as part of an act of *damnatio memoriae* of the legion.

The fourth century and later

Despite the legion's absence from the epigraphic record, and also from the *Notitia Dignitatum* (which also records no military units in Wales), it is certain from the archaeological evidence that the fortress at Chester continued in occupation during the 4th century. It may be that the legion was no longer the garrison, that it was divided, or that it changed its name during the various upheavals of the 4th century

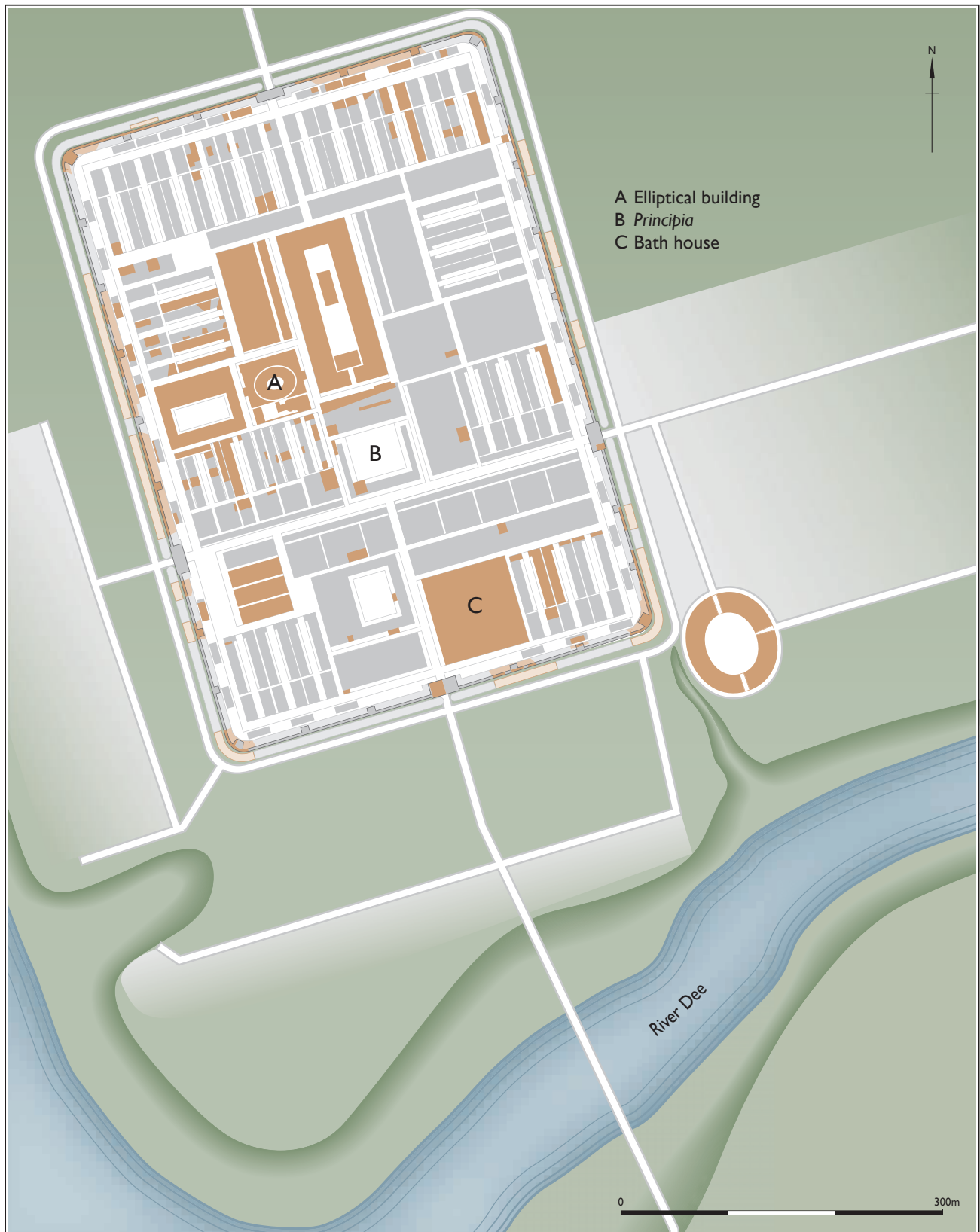


Fig 4 The fortress and amphitheatre of Chester c AD 200 (after Mason, 2012 figs 20c, 59).

(Malone 2006, 71). The evidence for continued occupation and building work at Chester is summarised by Mason (2012, 231–4). He argues that the garrison, however constituted and however depleted nevertheless remained until at least the 390s, and it must remain possible that there was a presence beyond the end of the 4th century. Malone (2006, 71) contrasts the situation at Chester with that at Caerleon, where major buildings including barracks were demolished and out of use around 300 when the fortress appears to have been abandoned (Zienkiewicz 1986a, I, 49–50). The *praefectus* of *II Augusta* which had been stationed at Caerleon is recorded in the *Notitia* at Richborough, and it is probable that the legion or its remnant, was relocated to this Saxon Shore fort in Kent. It seems at least possible that the garrison at Chester remained *in situ* because of the strategic coastal location of the fortress at a time when coastal defence was emphasised, for example by the provision of fortlets on the approaches to Anglesey (Symonds 2015, 61).

THE AMPHITHEATRE

The discovery of the amphitheatre

The first indication that an amphitheatre might have existed in Chester came in 1738, when part of a slate plaque (Fig 5) was discovered ‘*in macello*’, ie in Fleshmonger’s Lane, now Newgate Street, within 100 m of the north-east side of the amphitheatre. This object has had a somewhat chequered history (Jackson 1983). By 1742 it had been acquired by Dr Richard Mead (SAL, Minutes, IV, 142, 25 Nov 1742), and two plaster casts were made. One of these was presented to the Society of Antiquaries of London in 1754 and resides in the Fellow’s Room in their

premises in Burlington House, the other is now in Chester’s Grosvenor Museum. The sale of Mead’s collection in 1754 led to a sequence of unrecorded owners culminating in the presentation of the original to Saffron Walden Museum in 1836, by which time it had acquired a false provenance (Herculaneum). The relief, which is still in Saffron Walden, depicts a fight between a *secutor* and *retiarius* (Jackson 1983). The *retiarius* is notable in that he is left-handed (Wilmott 2007a), and the relief may represent a real fight between men whose names were known in Chester. It may have been part of the ornament of the amphitheatre, or possibly part of a gladiator’s tombstone.

The amphitheatre building was discovered during the excavation of a heating chamber for a rear extension to the Dee House Ursuline convent school in 1929. W J Williams’ (1929) recognition of the remains as those of an amphitheatre was a remarkable feat of interpretation given the fact that the existence of the building was unsuspected, and that only a small section of the buttressed wall was exposed (Figs 6, 188–190). Williams’ discovery was entirely accidental:

‘A second brass of Hadrian found by a workman, and shown to me in the street, led me to visit the site, where I found the solid ashlar being rapidly demolished with crowbar and hammer. Some of the stones were of a size unsurpassed in Roman Chester.’

Williams’ report described the discovery of pottery, in particular two mortarium stamps, and concluded that the structure was of 1st century date. The wall was constructed of

‘huge blocks of sandstone with a filling of sandstone rubble, and rested on footings of the same material set in puddled clay, the buttresses being of similar construction on the side which sloped down to the river.’



Fig 5 Slate relief of a left-handed *retiarius* found in Newgate Street in 1738 (Saffron Walden Museum)



Fig 6 The discovery of the amphitheatre in 1929. A segment of the outer wall of the amphitheatre was found to the rear of Dee House, the doorstep of which can be seen in the background.

He recognised the similarity of the curved and buttressed wall to that of the recently excavated amphitheatre at Caerleon (Wheeler and Wheeler 1928) and concluded that Chester's amphitheatre had been found. He further speculated that close to the end of the exposed section may have been a barrel vaulted entrance, and wondered whether the amphitheatre remains might not be those referred to by the 14th century Chester monk Ranulph Higden (*Polychronicon*, 1.48):

‘Stones are supported in walls like a deed of Hercules, and the earthwork is reinforced so it might stand more safely. Small Saxon stones stand on top of larger ones, and a hollow double vault lies beneath the ground’.

He also associated the building with the gladiator relief found in 1738, which he concluded might have been part of the ornamentation of the building.

The 1930s

The discovery of the amphitheatre did not happen a moment too soon for the long-term survival of the monument. In the same year, 1929, Chester Corporation had planned to replace the curving line of Little St John Street with a straight road from the end of Vicar's Lane to a reconstructed Newgate, at the east end of Pepper Street (Fig 7). The curve of the street was caused by the presence of the amphitheatre



Fig 7 The street plan in the amphitheatre area in 1929 showing the principal buildings mentioned in the text. The line of the proposed road across the amphitheatre site and the modern street plan are superimposed.

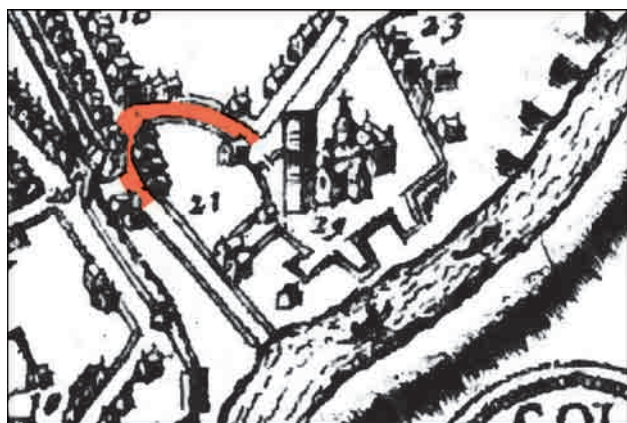


Fig 8 Detail of St John's church and the curve of the road round the amphitheatre from John Speed's map of 1610 (curving road shaded).

around the northern side of which it ran. This topographical feature is shown on the earliest reliable map of Chester made in 1610 by John Speed (Fig 8).

The boundary walls for the road had actually been built in 1929 (Fig 9: Thompson 1976). As a result of the scheme, excavations in 1930–31 took place under the aegis of the Chester Excavations Committee, directed by Professors R Newstead and J P Droop (Figs 10–12). In fact Newstead was very quickly on the scene; as early as 14th August 1929 the *Manchester Guardian* published an article so redolent of the time that it deserves to be quoted at length:

'When I went with Professor Newstead to view the preliminary operations on the by-pass road, one of the workmen on the convent extension hailed him with "Hollo Professor, I've got some more bits of pots for you", and from the recesses of his corduroys and a cloth bag he tipped great handfuls of dusty potsherds into the pockets of the professor's perfectly good grey suit. "First and second century all of them" the archaeologist pronounced as he returned home, sagging with the latest booty and added it to the accumulation there, where among the dahlias and marigolds he may be seen bareheaded and coatless under the sun with sleeves rolled up above the elbows, kneeling on the lawn ... washing the deposit of centuries from these earthenware fragments. Four fragments that the professor has put aside in a cigarette box he declares to date the wall – or the rubble between it and the front wall of the amphitheatre's seating bank – as definitely of the first century'

These works established the extent of the building and gave some idea of its plan, date and state of survival (Newstead and Droop 1932a). The main east entrance, and one of the *vomitoria* (p 180, Entrance 10) were exposed and partially excavated. The works also revealed the south-east corner of the legionary fortress (Fig 13: Newstead and Droop 1932b).

A plan of Newstead's excavation of Entrance 10 has recently been rediscovered in the Grosvenor Museum. Excellently referenced to extant features on the OS map, this plan can be accurately related to the records of the



Fig 9 The amphitheatre site in 1929 looking northwards up St John's Street. The car is parked in the entrance to the site of the proposed new road. The large building the rear of which can be seen to the right is St John's House.

2004–6 excavation (Fig 193). It was drawn by the architect P H Lawson ARIBA, FSA, who as a City Alderman, played a leading role in the campaign to preserve the amphitheatre. Several other drawings by Lawson, including an attempt to work out the orientation of the long axis, exist in the site archive.

During the years 1930–33 discussions took place between the Chester Archaeological Society, the local authority and the government concerning the road scheme and the amphitheatre (Thompson 1976, 130–133). The cheapest option was to take the road across the amphitheatre site, the more expensive to improve the curving Little St John Street, putting the southern edge of the road closer to the amphitheatre walls. Opposition to the cheaper scheme was vocal, including such leading figures as the Chief Inspector of Ancient Monuments Sir Charles Peers, Mortimer Wheeler, R G Collingwood, and Sir Cyril Fox. In April 1932 a national appeal to save the amphitheatre was launched by the Chester



Fig 10 Newstead's Trench 2 (Fig 13) which exposed the main east entrance (Entrance 3) of the second amphitheatre. St John's House is in the background



Fig 11 View along the proposed road line in 1931 showing the spoil heaps from Newstead's trenches.



Fig 12 Excavation photograph of Newstead's Trench 5 from the east (Fig 13) (for plan of this trench see Fig 193).

Archaeological Society (Fig 14). Five thousand pounds was promised or subscribed. In November the Prime Minister Ramsay MacDonald offered support (Thompson 1976, 130). On November 30th the *Chester Courant* reported that the Secretary of the Chester Archaeological Society had received a letter from the Italian ambassador which conveyed the best wishes 'for the success of your initiative' of the Italian *Capo del Governo*, Benito Mussolini. In early 1933, the Ministry of Transport refused to allow any road construction across the site. In the following year the Chester Archaeological Society purchased St John's House, a large, eighteenth-century town house which occupied the north-eastern part of the site, for the sum of £4,000, and also received a grant of £1,000 from the Pilgrim Trust. At the same time, the Corporation undertook to purchase all remaining properties required for the re-modelling of Little St John Street. HM Office of Works then undertook to commence excavation on completion of the road works (JCAS 1936, 124). It was recognised that this would take time, and the Society leased St John's House to Cheshire County Council for three years from May 1935.

In 1934 further trial excavation was carried out by Newstead at 19, St John Street and in St John's House to determine the northern limits of the amphitheatre (JCAS 1936, 124). The existence of a pair of drawings made

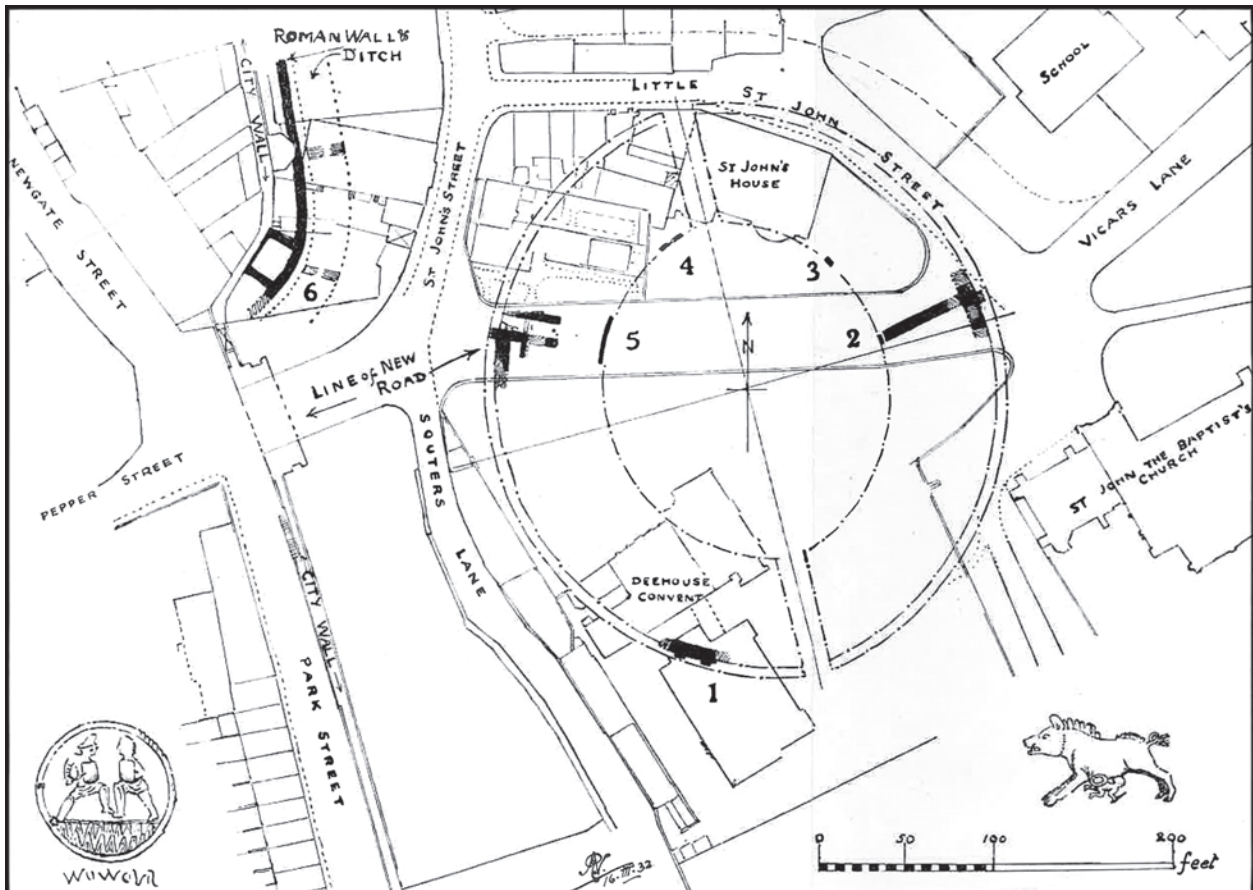
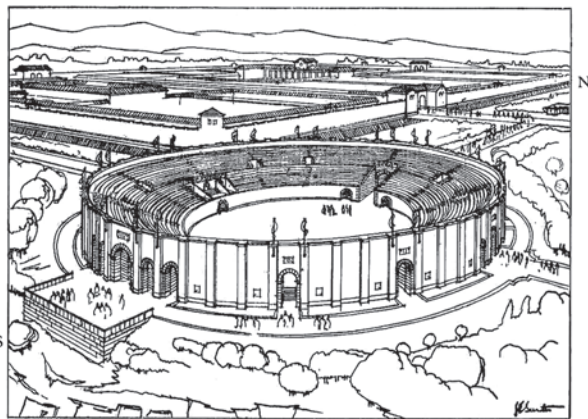


Fig 13 Location plan of the 1930s trenches (Chester Archaeological Society: Newstead and Droop 1932a).

THE ROMAN AMPHITHEATRE AT CHESTER. *Preserve a National Treasure for Posterity!*



CONJECTURAL RESTORATION OF THE AMPHITHEATRE AS IN ROMAN TIMES.
The greater part of the superstructure fell into ruin after the departure of the Romans, but enough has survived among the buried debris of subsequent ages to give a striking impression of its original purpose.

Four years ago, at the time of the extension of the Ursuline Convent School on the south-west sector of the site a massive buttressed wall nine feet thick and obviously of Roman construction was revealed. Later during trial digging on the site of a proposed by-pass road across the site from east to west, large sections of the outer ashlar-faced wall, an inner concentric wall, the earth bank and radial walls, on which the tiers of seats rested and of the arena wall standing at one place to a height of nine feet were unearthed, thus making possible a tentative reconstruction of the whole plan. The structure proves to have been approximately 314 feet in length by 286 feet in breadth, with an arena 190 feet by 162 feet.

The foundations and lower courses of the south-west angle tower of the fortress, shewn immediately in rear of the Amphitheatre in the above Restoration are to be seen just outside the Newgate.

Models of the Amphitheatre and photographs of the excavations may be inspected free of charge at The Amphitheatre Bureau, 42, Newgate Street, Chester. Photographs of the model of the remains are available at 3d. each, post free 4d.

Fig 14 Leaflet issued in 1933 as part of the amphitheatre campaign.

in 1934 by the architect P H Lawson showing a scheme for the presentation of the amphitheatre while retaining both St John's House and Dee House, strongly suggests that this work was undertaken ultimately to inform the implementation of such a scheme (Fig 15).

The outbreak of war in 1939 ended any such ideas, and in September of that year three air raid shelters were dug on the site. These were located in the area defined by the flanking walls for the aborted road across the amphitheatre. The excavation of these shelters resulted in the destruction of a 'considerable portion of the northern flanking wall of the western entrance to the amphitheatre' (JCAS 1940, 164). This was the *vomitorium* which had been excavated by Newstead and Droop as their Site 5 (Fig 13). The work seems to have taken place without notifying the Archaeological Society, which protested strongly to the Office of Works.

Excavation and presentation 1952-72

Around 1950 the abandoned road corridor was converted into public gardens known as 'Amphitheatre Gardens'. By the late 1950s rental income from St John's House had increased to the point that the excavation of the northern half of the amphitheatre could be contemplated, with most

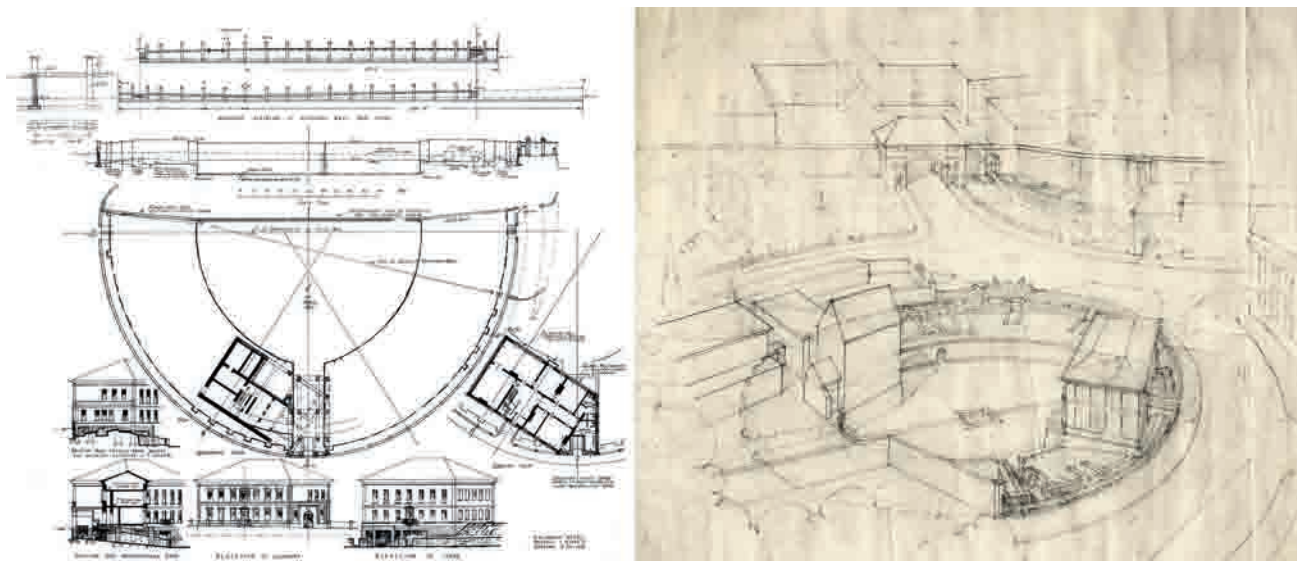


Fig 15 Plan and sketch by P H Lawson of an early scheme for the display of the amphitheatre, retaining both Dee House and St John's House.

of the money for the work coming from the Ministry of Public Buildings and Works to whom the site was transferred by Deed of Gift (Thompson 1976, 129–32). From the 1950s to the 1970s work was undertaken to ‘fully’ excavate and display the northern half of the amphitheatre. The work was directed by F Hugh Thompson, then Director of the Grosvenor Museum and later General Secretary of the Society of Antiquaries of London. Thompson’s report on the work, which contains valuable background information, was published in *Archaeologia* in 1976 (Thompson 1976).

Some work seems to have taken place on the site in 1952, as finds so labelled exist in the archive. This work is otherwise unrecorded, and Matthews (2003) has suggested that limited work might have taken place during the establishment of the Amphitheatre Gardens on the line of the abandoned road. In 1957, a series of trial holes were excavated at the request of the Ministry of Works and the City Corporation to establish the line of the outermost amphitheatre wall in order to fix the line of the new Little St John Street (Thompson 1962a; 1996, 50). This road was constructed as close as possible to the amphitheatre without impinging on its actual fabric (the inner edge of the pavement lies only 260 mm outside the ends of the side buttresses to the amphitheatre entrances on the north side). It is important to note that virtually no other examination of the outer wall fabric was undertaken during this campaign, and Thompson’s reconstruction of the positions of ‘buttresses’ on the outer wall in his later plans is, in fact, conjectural (Fig 20; Thompson 1976, 159). No effort was made to record archaeology on the line of the road during its construction, so it is likely that much of the contemporary surrounding of the amphitheatre disappeared without record. The following year St John’s House was demolished, once more under the aegis of Alderman P H

Lawson, as part of the general clearance of buildings that occupied the northern half of the amphitheatre (Thompson 1976, 131).

In 1960 excavation began in earnest, with the clearance of the cellar of St John’s House and the formal excavation of the *cavea* or seating bank beneath the floor of this building (Figs 16, 181). The work revealed the existence of timber beam-slots beneath the piled seating bank material, and this was the first indication of what Thompson interpreted as a timber precursor to the stone-built amphitheatre. The discovery of these traces was attributed to the careful trowelling of one of the schoolboy volunteers, the late Dai Morgan Evans, who, by coincidence, in later life was to be Thompson’s successor-but-one as General Secretary of the Society of Antiquaries of London (Thompson 1976, 135; 1996, 51). The timber traces were christened the ‘grillage’ by Thompson in response to comments made by the contractors on site (Thompson 1996, 51). At the same time the excavation of the main north entrance of the amphitheatre, which lay adjacent to St John’s House, was undertaken.

The excavation area was bounded on its south side by the boundary wall of the Dee House convent school (Fig 17). The floor of the arena lay some 4 m below the base of this wall. To enable the excavation of the arena it was necessary to construct a substantial and deep concrete retaining wall in order to retain the archaeology of the southern half of the amphitheatre, and of course Dee House itself. The retaining wall was 82 m long, 1.8 m thick and 4.5 m high (Weaver 1976). A trench the width and depth of the intended wall was cut along the line of the Dee House boundary (Fig 19, Tr 1). The trench was shuttered and concrete poured. The brick boundary wall, 2.7 m in height, was then rebuilt on top of the linear concrete slab.



Fig 16 Excavation in the cellar of St John's House, 1960.



Fig 17 An early stage in the Thompson excavation from the Newgate arch. Note the close fence screening the work from public view.



Fig 18 The excavation of the arena wall in 1961–2.

This trench effectively bisected the archaeology of the amphitheatre, with only a partial sectional record kept. The sections drawn at the western end of the retaining wall produced further evidence for the so-called ‘grillage’. These informative sections were not included in Thompson’s publication, and are published for the first time, albeit schematically, in the present volume (Fig 107).

One of the reasons that the 1960 sections both along the line of the concrete wall and in the edge of the cellar of St John’s House are so valuable is that they are some of the few records that show the archaeological and stratigraphic relationship between the seating bank and the arena wall. In 1961 trenching revealed the top of the arena wall (Fig 19, Tr 2, Tr 4, Tr 5, Tr 7; Thompson 1976, 132), and the mechanical removal of ‘overburden’ began. In 1965–6 the face of the arena wall was exposed in a series of trenches cut through the arena fill along the curve of the wall. Although baulks were left for recording, only two sections were drawn (Thompson 1976, 144, fig 5). At the same time a trench 1.22 m wide was cut through the seating bank to expose the rear face of the arena wall. The butt ends of ‘grillage’ beams were recorded, but if there were any subtleties in the make-up of the seating bank in relation to any structural changes in the arena wall, this information was lost. Where the arena wall was leaning it was jacked back to the vertical (Fig 18). To hold it in position, the trench to the rear of the arena

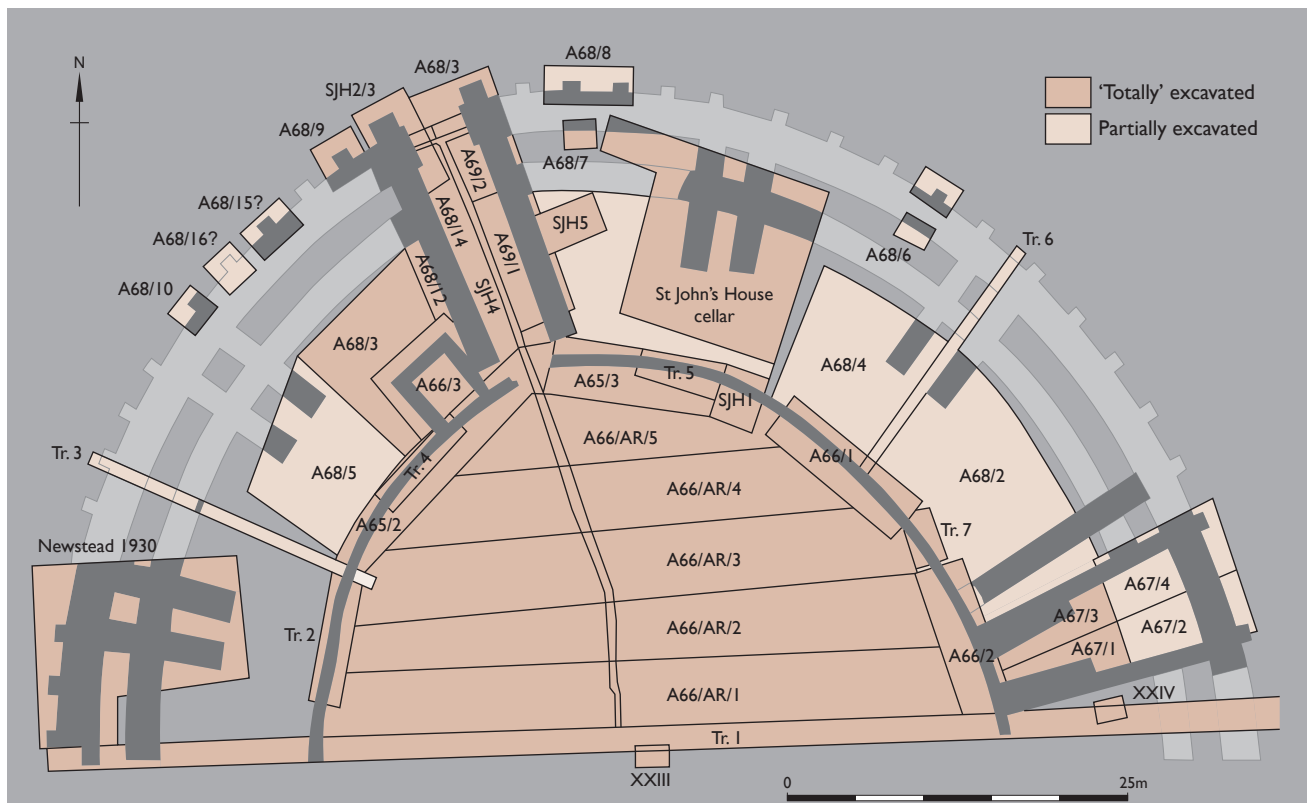


Fig 19 The northern half of the amphitheatre, showing Thompson’s actual excavation areas and the extent to which they were excavated (after Keith Matthews).

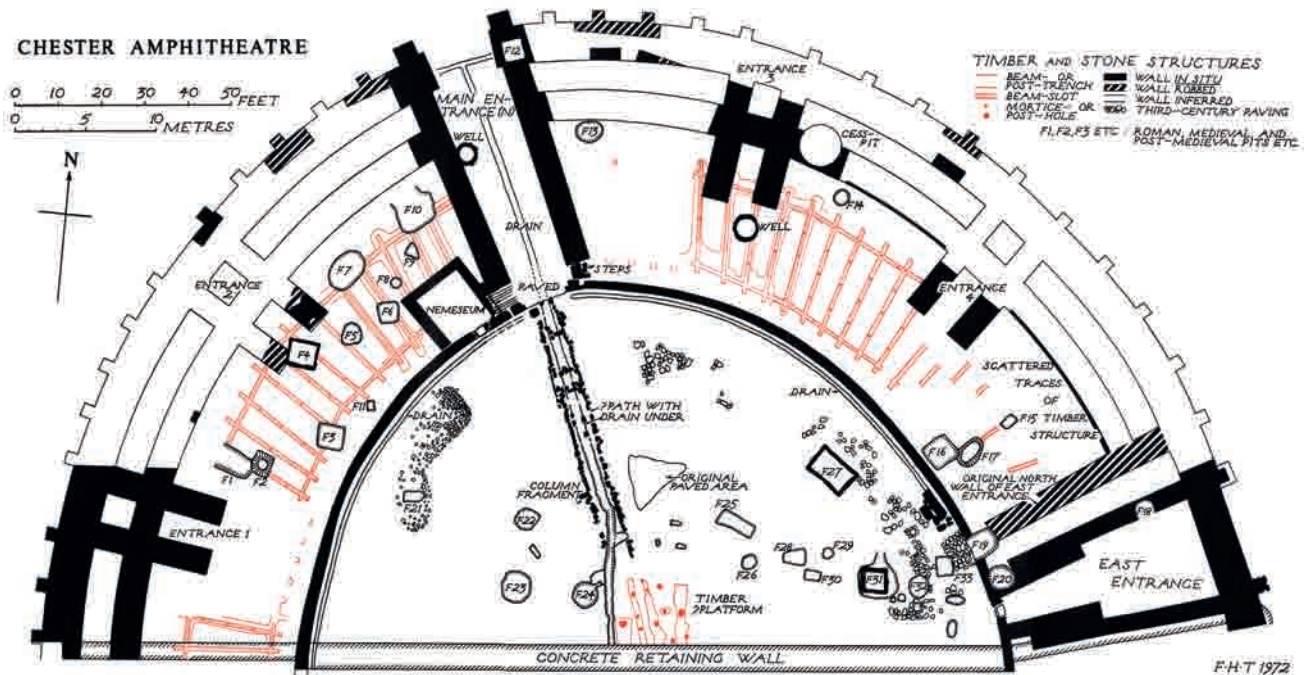


Fig 20 Thompson's published excavation plan (Society of Antiquaries of London).



Fig 21 View of Thompson's excavation around 1963. The arena has been cleared by machine, spoil is piled on the cavea. Note the concrete retaining walls behind the north entrance and Nemesium.



Fig 22 Machinery at work on the cavea.

wall was filled with concrete, which was tied into the original stonework with non-corroding metal ties (Weaver 1976, 238). This concrete was also carried around the backs of the walls of the main north and east entrances. Here too any relationship between the seating bank and the entrance structures was removed with virtually no record. By the end of 1966 the principal north and east entrances had been explored, the arena wall exposed and consolidated, the retaining wall installed and the St John's House cellar excavated. Figure 19 shows the

areas actually excavated by Thompson. The plan is based upon an analysis undertaken of the original records by Keith Matthews. Some areas were 'totally' excavated, though even here Thompson did not excavate all of the Roman levels, and certainly did not go below them, and therefore did not pick up the prehistoric evidence. In the areas 'partially' excavated he dug to the top of the *in situ* Roman archaeology which remained intact. Figure 20 is Thompson's published site plan which does not make clear which areas were excavated, and to what level excavation



Fig 23 The northern half of the amphitheatre as presented in 1972 viewed from the Newgate arch (contrast Fig 17).

was undertaken. Except in the arena it does not appear that the natural bedrock was anywhere encountered.

The arena was largely excavated by the use of earthmoving machinery; a ‘deliberate decision [was made] to remove mechanically all but the final 2 ft (0.61 m) of this overburden’ (Thompson 1976, 149). This removed in excess of 3.5 m depth of archaeological deposits across half of the arena area dating from the end of the Roman period to the present without record. In 1967 the lower levels of the arena fill were excavated by hand (Fig 21). In 1968 machinery was again used, this time on the seating bank, with the aim of exposing more of the timber ‘grillage’ (Fig 22).

‘Since a large-scale investigation of the timber amphitheatre would necessarily involve the removal of a great quantity of overburden, even after the general reduction of levels carried out mechanically in 1963, it was concluded that machinery would again have to be employed. ... The method adopted was to strip large areas of the seating-bank of the stone amphitheatre to a width of approximately 36 ft (10.96 m) from the rear face of the arena wall, in order to reveal not only the timber grillage but also the stone side-walls of minor

entrances. ... By gradually planing off the overburden the Drott [tracked shovel] was intended to expose the timber features from the highest level to which they survived down to their actual foundations’ (Thompson 1976, 138–9).

Once the tops of timber uprights were exposed in plan, only one area was further excavated by hand (Fig 19, A 68/3).

In 1970–72, the monument was further consolidated and opened as a public monument (Fig 23), for which the Department of the Environment published a short guide leaflet (Thompson 1971). The portions displayed were the deep areas of the arena and the east and north principal entrances.

‘Although it was wished to display as much of the excavated remains as possible, some walls, for example the outer wall of the amphitheatre and the flank walls of the subsidiary entrances, had been so reduced by robbing that it was impracticable to leave them open for display’ (Weaver 1976, 239).

Thompson (1976, 149) had accepted that the widespread machining of the site would result in a ‘loss of artifacts, and possibly also of structures’. In later years he recognised the demerits of the method. He wrote;

‘So if I have a conclusion looking back over the amphitheatre operation, it is perhaps that we might have been a little ruthless and ham-fisted in our approach to the digging out of vast quantities of soil’ (Thompson 1996, 53).

Thompson’s rapid publication of the excavation in *Archaeologia* (Thompson 1976) was a landmark in the study of the amphitheatres of Roman Britain. In the same volume the account appeared of early excavations at Maumbury Rings, Dorchester, a henge monument which had been converted for use as an amphitheatre (Bradley 1976). Together, these reports were the first major accounts of British amphitheatre excavations since the Wheelers’ 1928 report on Caerleon. The conclusions derived from the work were therefore extremely influential. Thompson postulated the existence of two amphitheatres; the first, wholly timber built, was represented by the so-called ‘grillage’ and was dated according to the phasing of the legionary fortress to the late 70s AD, while the second was composed of all excavated stone elements, including two concentric outer walls, was wholly stone built, and was dated by various means, archaeological and inferential, to c AD 100 (Thompson 1976, 182).

Dee House and development, 1992–2000

The future of the amphitheatre has been, and remains widely seen to be, inextricably linked with that of Dee House, the Grade II listed building which occupies the southern half of the amphitheatre. The history, archaeology and importance of this building will be described in Volume 2 of this report. The building was, as already noted, used as a convent school of the Ursuline order from 1925. In 1929 the construction of a new school wing to the south of the building led to the discovery of the outer wall of the amphitheatre by Williams. In 1976, following the opening of a new Catholic high school, the Dee House School closed, and the buildings were acquired by Post Office Telephones (later British Telecom) and converted for use as a telephone exchange.

The demolition of Dee House in order to excavate and display the entirety of the Roman building has been discussed frequently within the last thirty years. Several different proposals have been drawn up for the monument, all involving some element of excavation and display, and other works have been carried out on parts of the site, all of which have required various degrees of archaeological evaluation.

In the mid-1980s a local entrepreneur, Mr Tony Barbet, proposed to purchase the site. Barbet planned to excavate the remainder of the amphitheatre and to ‘reconstruct’ a portion of it. Plans drawn up by the architects MacCormick in 1986 for Barbet’s ‘Deva Roman Centre’ show a very large, proposed building occupying the entire Dee House site backing onto the Bishop’s Palace (Fig 24). The amphitheatre would be fully excavated and the south-west quadrant ‘reconstructed’ to full height. Planning consent

was given in 1990, including for the demolition of Dee House, but the scheme failed due to financial problems, and consent lapsed in October 1995. Meanwhile in 1993, a planning application was submitted by British Telecom to Chester City Council for works at Dee House, including the demolition of former convent school buildings to the south to be replaced by new-build, the refurbishment of Dee House, the demolition or refurbishment of the chapel, and the clearance of outbuildings to the east of Souters Lane. This proposal required an archaeological evaluation which was undertaken by the University of Lancaster Archaeological Unit (Buxton 1993). Forty trenches were recorded across the southern part of the site (Fig 24, 1–40). The brief for the work required that excavation should cease when ‘significant’ archaeology (defined as being earlier than the building of Dee House in 1730) was revealed. In practice allowance was made for the excavation of earlier deposits in twelve instances, at the City Archaeologist’s request (Buxton 1993, 11). In broad terms the work showed that, beneath the core of Dee House, cellarge had destroyed virtually all of the archaeology while under the later accretions to the building, preservation was somewhat better. Chester Archaeology undertook a second phase of evaluation in six trenches in 1994 (Fig 24, 41–46; Cleary *et al* 1994).

In 1995 British Telecom sold the site. Dee House and its immediate surroundings to the north and west were purchased by Chester City Council while the land and the 1929 classroom buildings to the rear of Dee House were acquired by property developer David MacLean. Consent was granted for a new structure to replace the derelict school buildings to the rear. These were the buildings whose erection had first revealed the amphitheatre. Work on the new building, Trident House, which now houses a Civil Justice Centre began in 1999. It was designed to cause minimal damage to the buried remains through the reuse of existing pile foundations, and an archaeological evaluation and watching brief was maintained on the construction work by Dan Garner for Gifford and Partners Ltd (Fig 24, 47–49; Garner 2001). From before the onset of construction public interest in the monument was again heightened and a local interest group (the Chester Amphitheatre Trust) was formed to lobby local politicians. The Trust’s main aims were to halt progress on the new building and to encourage excavation of the remainder of the amphitheatre. In a loud echo of the controversy of the 1930s passions were roused, banners and placards around the city and district proclaimed ‘Save our Amphitheatre’, and the office of the Lord Chancellor, Lord Irvine, was drawn into an inquiry on the whole scheme. Despite vocal and active local opposition the inquiry found in favour of the work, and the building was completed in 2001. Dee House has remained unoccupied since its acquisition by the City Council. It is now owned by the successor local authority, the Cheshire West and Chester Borough Council (CWAC).



Fig 24 Plan of all archaeological interventions on the amphitheatre site since 1972. 1–40, LUAU (Kath Buxton) (1993); 41–46, Chester Archaeology (R Cleary) 1994; 47–49, Gifford (Dan Garner) 2004; 50–54, L-P Archaeology (Dan Garner) 2015; I–XII, Chester Archaeology (Keith Matthews) 2000–03; A B and C, Chester Amphitheatre Project 2004–6.

In the winter of 2015/16 additional evaluation trenches were excavated by Dan Garner for L-P Archaeology to further assess the survival of the remains in front of Dee House (Fig 24, 50–54). This was connected with an attempt to find a developer willing to acquire the building and its environs and to put it to beneficial use. In an echo of the protest of the 1930s and 1990s, public passions were inflamed once again when a 150 year lease of the building was proposed. At the time of completion of this volume (April 2017), this lease had been granted to Messrs Thwaites of Lancaster.

Research 2000–2003

In a development separate from the Dee House controversy, though in part prompted by it, Keith Matthews of Chester Archaeology drafted a preliminary research framework for the site in which estimates of the surviving quantity of archaeology were attempted (Matthews 2000a). In the same year, 2000, Matthews undertook an evaluation of the conserved area of the amphitheatre. At the beginning of the work David Mason (2000b) rehearsed the recent development history and the rationale for the excavation in the periodical *Minerva*. Nine small trenches were excavated to establish whether any archaeological deposits survived on the exposed part of the site, and if so, whether buried deposits or structures were deteriorating as a result of visitor activity (Matthews *et al* 2001c). This work clearly showed that the northern side of the monument had not been as totally excavated as had been believed, and Matthews undertook an examination of the Thompson archive, which confirmed this (Fig 19). In the following three years further work was undertaken by Matthews, again principally on the northern half of the amphitheatre, this time to answer a series of specific academic questions raised in the Research Agenda (Fig 24, I–XII; Matthews 2000a). In particular the work was aimed at recovering information on the post-Roman history of the amphitheatre – an area virtually ignored by Thompson. Surviving Roman stratigraphy in the east entrance and on the seating banks was also examined and recorded (Matthews *et al* 2002, Matthews *et al* 2003). The excavation was run as a community project, staffed by members of the Chester Archaeological Society, archaeology students from Chester College of Higher Education and West Cheshire College, and by other local interested volunteers, including members of the campaign group, the Chester Amphitheatre Trust. Matthews' work clearly demonstrated that a great deal of intact and valuable archaeology survived in the area previously explored by Thompson. The work also cast great doubt on Thompson's interpretation. Matthews found convincing evidence that Thompson's so-called 'concentric wall' (the inner of the two walls around the outer circumference of the amphitheatre) was contemporary with the 'grillage'. Matthews followed Thompson's association of all stone elements of the building as a single construction. The logical conclusion was reached – namely that the 'grillage' was part of an amphitheatre with a single structural phase (Matthews 2001b, Matthews *et al* 2002).

THE CHESTER AMPHITHEATRE PROJECT

Background

The Chester Amphitheatre Project grew from the continuing controversy over the state of the amphitheatre and its environs, particularly the construction of Trident House and the condition of Dee House in the early part of the 21st century. In January 2001, English Heritage (EH) called for tenders for the production of a Conservation Plan for the site. This was drawn up by Donald Insall Associates (2001). As part of this document a costing exercise for total excavation was undertaken by one of the present authors for English Heritage (Wilmott 2001). During spring of 2002, discussions between EH and Chester City Council (CCC) were held during which the future excavation of the amphitheatre was considered and a brief for archaeological work was drawn up (Wilmott 2002). The Chester Amphitheatre Project was finally conceived in 2003 following representations made to the then Chairman, and Chief Executive of EH, Sir Neil Cossons and Dr Simon Thurley. The project was undertaken as a 50:50 funded joint EH/ CCC project. It was a 'high priority in the policy of the City Council' and was a designated EH Beacon Project. The project had three basic components:

- An archaeological research framework
- A non-invasive survey of the amphitheatre and its environs
- Excavation within the amphitheatre area.

These were detailed in a briefing paper to a Chester Amphitheatre Steering Group on October 17th 2003.

One of the key elements of the project was the formulation of a Research Framework for the amphitheatre, the production of which was funded through the EH Archaeology Commissions Programme. The Donald Insall Conservation Plan (2001, 107) had noted that

'Any future archaeological investigation or excavation proposal must be based on a research agenda which is designed to reveal a full multi period understanding of the site or, if more limited in scope, must not result in the destruction of material that could compromise that aim.'

The Framework was produced by Oxford Archaeology (Wain 2002), and summarised and built upon earlier work towards this end, particularly by Keith Matthews (2000a).

Although the site of the Roman amphitheatre was to be at the heart of the work, the project was to be a great deal broader than the examination of a single structure in a single period. The existence of the amphitheatre had a profound impact on the development of this part of Chester in later centuries, and the broader remit of the project was to understand as far as possible the whole history of a Study Area extending spatially between Grosvenor Park to the east and the City Walls to the west, and between the amphitheatre to the north and the river Dee to the south, and chronologically from prehistory to the present. Based



Fig 25 Geophysical survey of the study area (GSB Surveys).

upon this understanding it would be possible to formulate options for the preservation and presentation of the whole area based upon a thorough knowledge of its formation through time.

Non-invasive survey

In order to examine the post-Roman landscape history of the Study Area a whole range of non-invasive techniques were deployed. Following the approval of a Project Design for this work (Ainsworth and Wilmott 2004a), it commenced in early 2004 under the management of Stewart Ainsworth, Senior Investigator at EH. The work included large-scale topographic and analytical landscape survey, ground-based photogrammetric survey and laser scanning, architectural survey encompassing all historic buildings in the area. Ground-based and aerial photographic surveys were also conducted. The majority of these techniques provided information on the development of the post-amphitheatre landscape of the Study Area, and are therefore fully described in the second volume of this report.

Geophysical survey was also undertaken and GSB Surveys of Bradford carried out a ground penetrating radar survey of most open spaces within the overall study area. Like the other surveys, much of the result of this work is reported in Volume 2. Over the amphitheatre itself the results showed that archaeological survival was patchy or intermittent. The survey did, however, suggest that of the

two northern quadrants of the structure it was the north-western quadrant that showed most potential for surviving intact archaeology (Fig 25), and this result guided the decision on excavation areas.

Excavation

Options for excavation were derived from a thorough analysis of the non-invasive work, and of the past and recent excavations. One of the first conclusions of this review was that it would not be appropriate to undertake any further small-scale evaluation. So many small interventions had been made over the years, particularly in connection with successive ideas on the site's future, that the area was pock-marked with unconnected evaluation trenches and it was felt that we were potentially in danger of losing archaeological legibility over some parts of the site (Fig 24). Additionally these works, particularly those of Keith Matthews, had hinted at interpretative and preservation issues that could only be resolved through large-scale excavation. The work was to be directed by Tony Wilmott, Senior Archaeologist at EH and a co-director from CCC. The departure of Keith Matthews to take up another job led to the recruitment to this position of Dan Garner in Spring 2004. Excavation was originally planned to take place over two field seasons in 2004 and 2005. Each season a core professional fieldwork staff of two Site Supervisors, eight Site Assistants, a Finds Supervisor and Assistant, and an Environmental Supervisor

and Assistant were recruited. The permanent specialist staff of Chester Archaeology also provided full-time on site presence (see acknowledgements). The project was undertaken in partnership with the Universities of Liverpool and Chester, and training was provided to archaeological students from these two institutions. At any one time there were eight students on three to four week training rotations. A programme of local volunteer involvement was also an important part of the project.

Following the 2005 season, CCC decided that an archaeological presence should be maintained on the site in the following year, so in 2006 a third season took place, directed by Dan Garner and funded wholly by CCC. This decision was highly fortuitous, as it revealed the prehistoric component of the site.

Objectives

The archaeological objectives of the work were laid out in successive project designs (Wilmott 2004a, 2005). They were:

- 1 To establish the scope and extent of the Thompson excavations, and the state of survival of the archaeology of the northern side of the amphitheatre.
- 2 To establish the post-Roman uses of the northern half of the amphitheatre.
- 3 To establish the survival of post-Roman deposits on the southern side of the amphitheatre.
- 4 To establish the date and sequence of the filling of the arena.
- 5 To establish the immediate post-Roman use of the southern side of the amphitheatre.
- 6 To explore the connection between the amphitheatre and St John's church.
- 7 To enhance knowledge on the construction of the stone-built amphitheatre.
- 8 To reassess the evidence for a timber amphitheatre phase, with particular regard to the possibility that this evidence relates to internal structures within the stone-built amphitheatre, and not to a separate and earlier phase.
- 9 To establish the pre-amphitheatre uses of the site.
- 10 To retrieve material culture and ecofacts which could further our understanding of the history of the amphitheatre and its surrounding landscape within the Study Area through time.

To this end it was decided to excavate three areas (Fig 24, A, B, C).

Excavation methodologies

Areas

Area A was designed to address objectives 1, 2, 7, 8, 9 and 10. It was located in the north-western quadrant of the amphitheatre taking in the area between the principal north entrance and the westernmost *vomitorium* on the north side; an area measuring 34 × 20 m. The intention

here was to empty the trenches previously excavated by Thompson, and to totally excavate, down to natural, the remaining archaeology within the area, leaving the stone walls of the building.

Area B was to examine objectives 3, 5, 6 and 10. It coincided approximately with the area between the eastern entrance and the first *vomitorium* in this quadrant; an area of 20 × 15 m (it was extended westwards in an area 10 × 9 m during the second season). Given the specific objectives for this area, only the post-Roman archaeology was excavated to the level of surviving, intact Roman stratification and structure. In practice the Roman structures were so badly preserved and so intensively robbed that the excavation of the robber trenches and other intrusive features fortuitously provided much additional evidence concerning the Roman structure and phasing.

Area C, designed to address objectives 3, 4, 5, and 10 was excavated to the level of the arena floor. For safety and archaeological legibility, because of the 4 m depth of archaeological deposits to be explored, the area measured 9 × 10 m at the top, and was gradually stepped down to an area half this size.

At the end of each season the site was covered in Terram geotextile, and the fragile remains sandbagged in order to protect the archaeology from adverse winter weather. At the end of the 2006 season the site was again winter protected. In the absence of a clear way forward on the display of the excavated remains the archaeology was protected with geotextile and layers of sand before being back-filled with archaeologically neutral material in March 2008. The further history of the consolidation and display of the Roman building is summarised in Volume 2 of this report.

Site recording

The excavation was recorded using a hybrid system based upon the principles and techniques outlined in the *Chester Archaeology Recording Manual* and using the suite of recording forms in use by Chester Archaeology. The variation from the normal practice then in use in Chester was the adoption of a grid-based single-context planning system using the planning sheets pioneered by the Museum of London Archaeology Service, as this system is proven to be the most effective in dealing with deep, complex, and disturbed urban stratification.

Finds

The finds from the amphitheatre excavations were processed and catalogued according to the post-excavation procedures of Chester's Historic Environment Service (formerly Chester Archaeology). Throughout the project a policy of total finds retrieval and retention was adopted. All artefacts recovered from the processing of samples were recorded as such and processed in the same manner as hand-excavated material. All iron and copper-alloy artefacts were X-radiographed with selected items being X-radiographed

from a number of views in order to aid identification. A full assessment was then carried out for further conservation requirements. Mechanical cleaning was kept to a minimum with some limited X-ray fluorescence (XRF) analysis being undertaken.

The assemblage was subsequently examined and recorded in detail including the material, object identification where possible, quantity, completeness, condition, dimensions, description and date. Measurements given are those of the items as excavated including their corrosion products unless stated otherwise. Full use of the X-radiographs has been made when illustrating the metalwork to avoid representation of uninformative encrustation. Some illustrations of metalwork lack a section or profile, being so heavily encrusted that these details are obscured and accurate measurement was not possible. There are no items of wood, leather or textiles due to the lack of any waterlogged deposits on the site.

All data was subsequently stored on an Access database. The finds, paper and computerised records are available in the site archive.

Environmental sampling

During the excavation features from all phases were sampled intensively, with flotation samples taken from all contexts unless there was clear evidence for disturbance or mixing. Flotation samples of 40 litres were taken as standard, with up to 100 litres from some contexts, or 100% of small contexts. Flotation samples were processed on site using a Siraf type tank with 0.25 mm flot mesh and 0.5 mm mesh for the residue. Residues were sorted in their entirety down to 4 mm with 20–25% of the >2 mm fraction sorted. The smaller than 2 mm residue was retained. Dried flots and residues were submitted to English Heritage for assessment and analysis.

The intensive sampling (Baker 2006) resulted in the collection of very significant environmental evidence. Perhaps the most spectacular result of this work was to recover the largest single assemblage of fish bone from any single site in Roman Britain (pp 412–428).

Public access, popular publication and the amphitheatre conference

In addition to the pursuit of the archaeology, the project had a broader brief, to engage the public and to undertake educational and training activities. The excavation was fenced using wire Heras fencing, and the passing public were encouraged to talk to the site staff. Early discussions took place on the provision of a viewing platform. It was the idea of David Webb, Facilities Manager at EH, that the concrete retaining wall built in the 1960s should be topped by a formal walkway from which all excavation areas could be observed (the high brick wall on top of the concrete was demolished in early 2004 in preparation for the project). This was successful and remains a permanent feature of the current layout of the site (Fig 26).



Fig 26 Excavation in 2004. From the west, showing the walkway on top of the concrete retaining wall (pink areas are boarded).

Throughout the excavation a web site was constructed and regularly updated, newsletters available free on site were produced, and signage was also regularly updated. In addition an Outreach Officer was appointed to carry out tours at intervals through the day. A TV documentary on the first season of work was produced by BBC *Timewatch*, and the co-directors produced a weekly update on the work in diary format in the *Chester Chronicle*. During the first season an artist in residence, Julia Midgley, recorded the work in a diary and a series of impressive 'documentary drawings' (Fig 27). This work was published (Midgley 2006), and Julia's work was displayed in an exhibition at the Grosvenor Museum from June–September 2005. David Heke, photographer in residence throughout the excavation also exhibited his work, *The Amphitheatre in Focus* at the Chester Visitor Centre from December 2004 to October 2005, with regular updates over the months.

Overlapping with this was another exhibition entitled *To be killed with iron: the world of the Roman gladiator*, which was curated by Dan Robinson at the Museum and ran from July to August 2005. A booklet, *Chester Amphitheatre: from gladiators to gardens* (Ainsworth and Wilmott 2005) summarised the ongoing excavation and looked at the broader history of the study area through time. EH (2006) devoted a full issue of its *Research News* to aspects of the project. Other interim reports have also been published (Wilmott *et al* 2006, Wilmott and Garner 2009).

Beyond doubt, however, the most successful activity organised through the project was the major international conference *Roman Amphitheatres and Spectacula: a 21st Century Perspective*, held at the Grosvenor Museum, Chester on the weekend of 16th–18th February 2007.



Fig 27 Painting by artist in residence Julia Midgley featuring supervisor Nathan Chinchin (centre). The multiple similar figures invoke rapidity of work.

This event attracted contributors from the UK, Ireland, Switzerland, Austria, Germany, Spain, the USA, Canada and Brazil. When the collected papers were published (Wilmott 2009a) additional articles were included by colleagues in the field from Croatia and Bulgaria. The plenary public lecture entitled *Arena of Conflict: facts, myths and speculation about gladiatorial combat in ancient Rome* was presented by the Harvard Professor of Latin, Prof Kathleen Coleman the evening before the conference. Since this event the authors have spoken about the amphitheatre at further conferences both national and international (at Carnuntum, Austria, Augst, Switzerland, the 2006 International Congress of Roman Frontier Studies at Leon, Spain, and the 2016 Roman Archaeology Conference in Rome). There is no doubt that the Chester amphitheatre is now well known to the international community of amphitheatre and Roman military scholars.

Post-excavation assessment and analysis

Rationale

It was established at an early point in the initiation of the project that the process and costs of the assessment phase would be separate from, and additional to, the funds

provided for fieldwork. This meant that the completion of fieldwork and the completion of the site archive informed the preparation of a *Project Design for Assessment* (Wilmott 2007b). This inserted an extra stage into the usual MAP2 (English Heritage 1991) project management process, but allowed the resources needed for assessment to be accurately identified, and thus was a tool to define the way in which the 50:50 principle of funding for the work should be implemented.

In late 2007 CCC did not renew Dan Garner's contract of employment, though did eventually agree to fund him on a consultancy basis to complete aspects of the assessment and analytical work. The assessment of all categories of evidence from the excavation was begun in 2007. It was agreed that the stratigraphic and material assessments would be heavily 'front loaded', maximising the amount of work undertaken at this stage in order to minimise the length of the analysis phase. This decision was necessitated by uncertainty caused by the imminent local government reorganisation which resulted in the abolition of CCC, and the assumption of its duties, including the responsibility for the completion of the amphitheatre project, by the new Cheshire West and Chester Council (CWAC).

The form of publication for the project was the subject of extensive discussion between the funding parties before the programme of assessment work on the excavated material was formulated. A particular issue was the question of whether to publish as a single large volume or as two (relatively) smaller thematic volumes. For good academic and pragmatic reasons it was decided that the archaeology of the site lent itself to a two-volume publication. The decision to complete the project in this way was made and agreed between CCC (now CWAC) and EH (now Historic England).

This first volume deals with the prehistoric landscape discovered beneath the amphitheatre, and with the Roman amphitheatre from its inception through to its functional disuse. The initial intention was to include in this volume the evidence for occupation in the arena during the post-Roman period, as it was assumed on stratigraphic grounds that the features excavated were immediate post-Roman in date. Further study, and in particular the receipt of radiocarbon dating for these features, has confirmed an early medieval date. If anything this makes these features even more important than originally thought, and they will be reported in great detail in Volume 2. Residual Roman finds material is included in the present volume.

This first volume includes all pre-Roman and Roman stratigraphy, structural evidence, artefactual and ecofactual material, and the core narrative is derived from the excavated evidence. The second volume will deal with the periods from the re-occupation of the arena, and the subsequent robbing of its walls to the present. It will focus on the development of the area of Chester around the amphitheatre and St John's church. The earlier phases rely on excavated and structural evidence, while for the later periods the volume will include all data derived from non-invasive survey, amplified and illuminated by the excavated stratigraphic, structural, artefactual and ecofactual material. The core narrative for Volume 2 will be derived principally from the landscape history provided by the non-invasive survey.

The progress of the work of assessment was slowed by reorganisations in both funding bodies, but in April 2013 an Assessment document for Volume 1 (Wilmott 2013a) was produced and submitted together with an Updated Project Design which identified the level of resource needed to complete the volume, and laid out a timetable for the analytical and production work (Wilmott 2013b). At the time of writing (August 2015) the parallel assessment for Volume 2 is complete and work on the analysis is in train.

Archive

All stratigraphic and finds data have been entered onto a Microsoft Access database 2007 version. The finds, together with the paper, photographic, graphic and digital archives are available in the research archive housed by Chester Historic Environment Service, Cheshire West and Chester Council.

Report format

This volume contains the evidence, analysis and synthesis necessary to the understanding of the prehistoric and Roman phases on the site. It also embodies reassessments of earlier work on the site in the light of the findings of the 2004–6 excavation in order to present the most thorough possible picture of these phases of the site's history, in particular of course in the development of the successive amphitheatres.

The report presents a long and complex stratigraphic sequence, which has already been split by the adoption of a two volume model. There may have been an argument to further split the sequence to separate the prehistory out into a volume under a separate cover, but this would risk fragmenting some of the essential stratigraphic connections. Similarly, it became apparent during the analysis that much if not most of the finds and environmental material recovered did not relate directly to the function of the amphitheatre. Again this material might have been separately published, however this would reduce the possibility of teasing out the finds that were, in fact, associated with the function of the building. The report is therefore presented in four distinct Parts. This Introduction is Part 1, the Prehistory of the site is Part 2, the Roman amphitheatres themselves form Part 3, and the finds and environmental evidence are presented in Part 4. The short Part 5 presents the general summary conclusions, while introducing the material to appear in Volume 2.

We have adopted an integrated approach in order to maintain a narrative that considers all relevant evidence for each particular phase in chronological order. This is of particular importance in the presentation of environmental evidence, scientific dating and lithics and other finds within the discussion of the prehistoric phases. At the end of each Roman phase description there is an extended summary of the finds, dating and environmental evidence from that phase, and these are cross-referenced to the individual specialist reports published in Part 4. Similarly, the discussions of individual periods and structures are considered chronologically phase by phase, and a summary round-up of all the evidence is presented in the concluding Part 5. Context numbers are indicated by round brackets () and sample numbers with pointed brackets <>.

Periodisation and phasing

The building blocks for interpretation are the Phases (Table 1). These are the clear divisions of the stratigraphic sequence that were recognised and defined during the assessment and analysis of the stratigraphic sequence. Their identification is the result of stratigraphic analysis alone, taking no account of dating evidence or finds distributions. The Phases form the basic relative chronology within which specialist finds and other analyses were undertaken.

The Periods are interpretative sub-divisions of the chronology of the site derived from all analyses of phasing

Table 1 Summary concordance table of the Periods and Site Phases considered in this volume with dating.

Period	Site Phase	Description	Dating
0	0	Natural geology, and soils	
1		Prehistoric activity	c 6,000 BC–c AD 70
	1a	Mesolithic to early Bronze Age	c 6,000 BC–?
	1b	Middle Iron Age settlement	400–200 cal BC
	1c	Middle Iron Age cultivation	c 200 BC–c AD 70
	2	Late Iron Age cultivation	
2	3	Roman occupation before the construction of the amphitheatre	c AD 70–c AD 200
3		The first Roman amphitheatre	TPQ AD 71
	4	Construction of Amphitheatre 1a	TPQ AD 71
	5	Use of Amphitheatre 1a	c AD 71–92/4
	6	Construction of Amphitheatre 1b	TPQ AD 92/4
	7	Use of Amphitheatre 1b	c AD 92/4–c AD 200
4		The second Roman amphitheatre	c AD 200–280
	8	Construction of Amphitheatre 2	c AD 200
	9	Use of Amphitheatre 2	c AD 200–280
5	10	Change of use	750–950 cal AD
6		Disuse and robbing	11th century
	11a	Internal robbing	11th century
	11b	Robbing of outer wall	11th century
		Domestic occupation	
	12	Cultivation, structures and pits	
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		

and dating evidence. These largely reflect the functional sub-divisions of the archaeology of the site. For the purposes of Volume 1 these reflect discernible periods of prehistoric occupation and the use of the two successive amphitheatres.

Finds and environmental reports

The reporting of Roman artefactual and ecofactual materials from these excavations has been thorough and complete. The principal assemblages are derived from major, well-dated deposits at the end of Phase 5, and in the construction of Amphitheatre 1b at the beginning of Phase 6 c AD 100. Much of this material can be shown

to have been imported to the amphitheatre as refuse from elsewhere in Chester. However the fact that the deposition of this material is so well dated to the Flavian/ Trajanic period means that it reflects the range of activities within the fort and (especially) the *canabae legionis* of Chester during the first three decades of the existence of the Roman settlement. As such these studies form a benchmark for future studies of these aspects of Roman Chester. This is particularly important as published studies of very large material assemblages from the city undertaken to modern standards are few (but see finds reports in Mason 2005, Garner 2008, Ward, S *et al* 2012). Where there is reference to individual objects by catalogue number in the finds and

dating summaries of each Phase, references are to several catalogues:

Coins	CO(no)
Samian pottery	Sam Cat (no)
Other Roman pottery	Pot Cat (no)
Finds in functional groups	Func Cat (no)

Within finds catalogues context information is given in the format *Area (context number): Phase, description*, as eg A (459): Phase 11b, robber trench backfill.

Citation of Roman places

This volume has required parallels to be cited from many places in the Roman Empire. At the first mention of such places the formula ‘English name (*Roman name; Roman province*), Modern country’ is used. Thus Augst (*Augusta Raurica; Germania Superior*), Switzerland. After the first citation the name which is most familiar in archaeological literature is employed, thus Arles (not *Arelate*) and Vindonissa (not Windisch).

PART 2

BEFORE THE AMPHITHEATRE: THE PREHISTORIC PHASES

During the final season of excavation in 2006, within Area A, it became possible to explore deposits and stratigraphy beneath the seating banks of the amphitheatre. This work revealed an Iron Age agricultural landscape of several phases, associated with structures and including the survival of important archaeobotanical remains. The time-depth on the site is, however, even greater than this, as there is good evidence for Mesolithic occupation and settlement on the site, the remains of which were largely ploughed-out during the Iron Age. Thus the construction of the amphitheatre effectively preserved the underlying archaeological landscape in the same way that large extents of prehistoric landscape were buried and preserved beneath the earthworks of Hadrian's Wall (Wilmott 2009b, 128–30). The importance of these discoveries is such that they are extensively discussed below in order to place them in a local and regional context (pp 40–44, 63–71).

NATURAL GEOLOGY, TOPOGRAPHY AND SOILS (Phase 0)

In Area A the natural red sandstone bedrock (400) was reached at a level of 17.88 m OD. It consisted of the typical red Cheshire sandstone of the Chester Pebble Beds (p 3), with bedding planes sloping upwards from east to west and from north to south. The top of this deposit was fractured, but in the arena floor in Area C, and in Area A in a sondage designed to establish the depth of the outer wall of Amphitheatre 2, where the bedrock had been cut into, it was clear that the material is more solid and cohesive with depth. Some 20 m to the south of the amphitheatre (Fig 28) natural sandstone bedrock was defined in Trench 48 at 16.59 m OD, while slightly to the north in Trench 10 the level was 16.23 m OD. This drop in surface level of the bedrock of 1.65 m over a distance of some 100 m is insignificant, and demonstrates that the amphitheatre was constructed on a virtually flat plateau. Immediately to the

south of the amphitheatre on the western side of the south entrance, yellow-brown sand, which was interpreted as a natural deposit, capped the bedrock at surface levels of 17.11 m OD in Trench 8 and at 16.94 m OD in Trench 31.

To the south-west of the amphitheatre the situation was somewhat different. During the 2000–2001 watching brief, the edge of a natural terrace in the sandstone bedrock was identified (Fig 28; G180). This sloped with increasing steepness from east to west towards the present day Souters Lane, and was clearly the top edge of the natural ravine now occupied by the modern thoroughfare. Trenches cut within the edge of this ravine showed natural deposits at much lower levels than on the upper (amphitheatre) terrace. Thus in Trench 35 natural red loose-sand deposits were revealed at 15.63 m OD and in Trench 36 this material was reached at 14.54 m OD (Fig 28).

The history of this topographic feature is complex. In the area trenched the natural terrace had been partially filled with dumped material of 2nd-century date. A post-built structure was constructed on top of this material, and this was sealed by medieval and post-medieval cultivation deposits. There was, therefore clearly an element of backfilling and narrowing of the natural ravine during the Roman period (Garner 2001). Further north it is clear that the natural feature had been recut to present vertical edges, and on the eastern side part of this recut had been used to accommodate cellars. Within the cellar a sandstone wall marks a post-medieval revetment to the edge of the ravine. This may well be associated with documentary evidence for the recutting of the Lane in the late 17th and early 18th centuries which would have both widened and deepened the natural feature (we are grateful to Mr T Welsh for this information). Although the modern lane does not reflect the shape of the ravine in the Roman period, the excavated evidence demonstrates that it was a substantial natural feature which would have served as a constraint to construction (p 3).

The natural subsoil varied in texture and colour across the site. It was predominantly silty clay, varying from

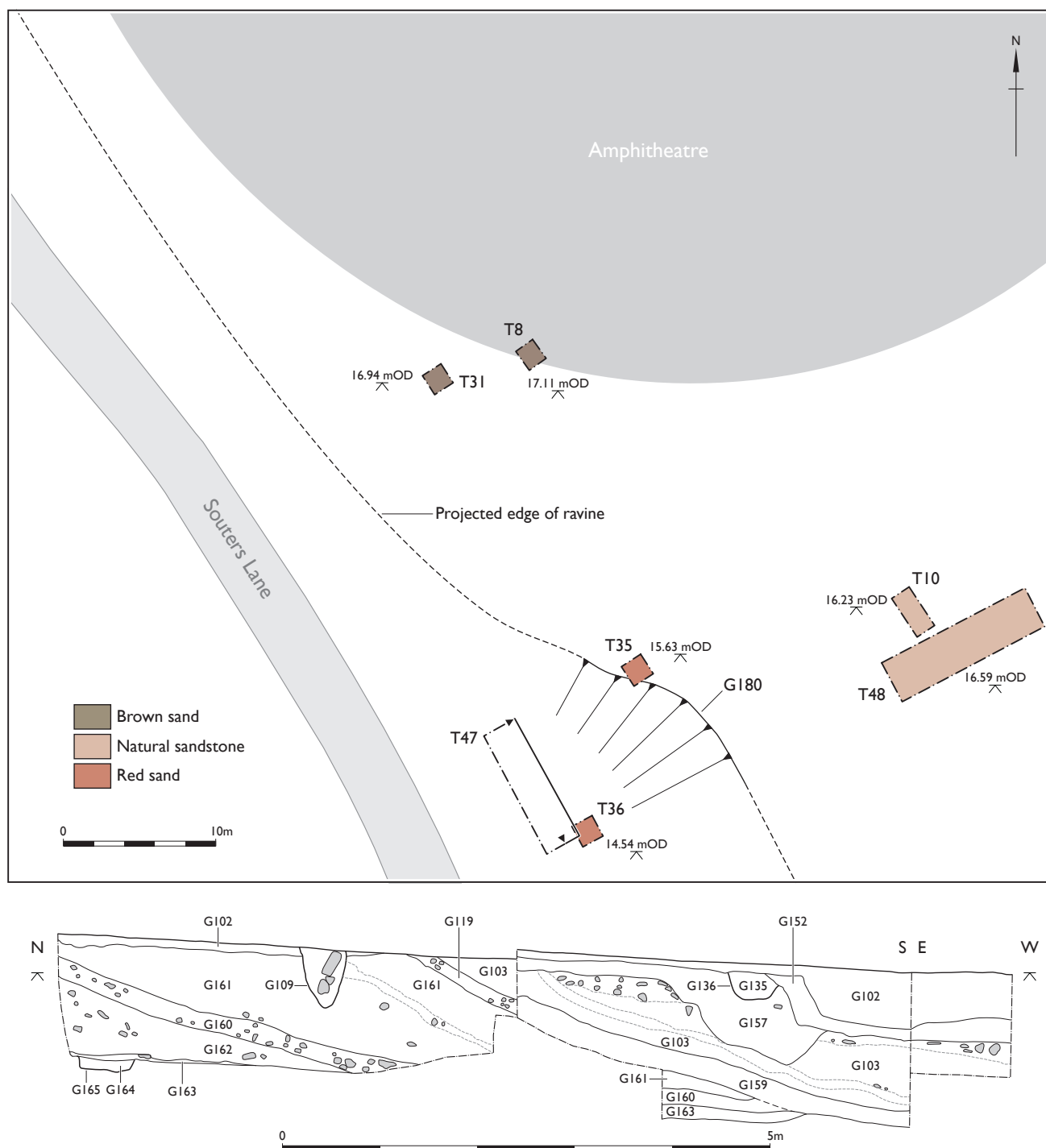


Fig 28 Plan of the area to the south-west of the amphitheatre showing the character and level of natural deposits where reached, and the edge of the natural ravine now occupied by Souter's Lane (G180). Trench 47 is located, with section.

red-brown to grey in merging and mixed colour horizons. There were also patches of reddish-grey sand within the deposit (566, 649, 650, 1101, 1277, 1278).

MESOLITHIC TO EARLY BRONZE AGE (PERIOD 1, Phase 1a)

Archaeological features

In Area A three features predated the structural features of Phase 1b (Fig 29), and are tentatively identified with the

earliest phase. The largest lay within the footprint of the later round-house. Though not directly cut by the round-house gully (1352), the relative sizes of these two features showed that they could not be contemporary. The feature, which was cut into the natural subsoil, was a shallow circular pit (1333) 2.28 m in diameter and 0.1 m deep with vertical sides and a flat base. It may have been associated with a single truncated stake-hole (1350, fill 1351), and an oval pit (1290) 1.3 × 1 × 0.2 m. This pit was filled with a very compact pale grey clay (1291). A small shallow sub-circular pit (1362, fill 1363) may have represented a root bole to a small shrub.

Pit (1290) was the only one of these features to produce finds. Its fill (1291) contained four lithic fragments (two prismatic blade fragments, a core fragment and a flake), all of broad Mesolithic to early Bronze Age date (Table 3), as well as heat-fractured stone and a fragment of fired clay of Fabric Q1 (p 62). The presence of the stratified lithics may indicate in situ remains for the period, which is otherwise represented only by a significant but dispersed residual

lithic assemblage. Without any form of scientific dating of the features, however, residuality cannot be wholly ruled out.

Struck flint and stone

By Barry Bishop

The excavations produced a total of 161 pieces of struck stone, most of which came from Area A with smaller quantities recovered from Areas B and C (Tables 2, 3). Only two pieces of unworked burnt stone were identified, one of flint or chert and the other of slate, and a small number of struck pieces had also been burnt. These indicate the use of fire, probably of hearths, although the dating of these cannot be determined.

Over half of the struck pieces were recovered from prehistoric contexts, the great majority from pre-Roman cultivation soils, with the remainder coming from later features that cut into these soils. It is likely that the flint work had originally been discarded onto the ground surface and later incorporated into the soil horizons which were reworked during the Iron Age. Overall, the assemblage is in good condition. Most pieces are either sharp or only slightly abraded, indicating that they had received only minimal post-depositional disturbance. No refits could be made but small groups of struck pieces of very similar raw materials were noted in some of the soil samples, again suggesting minimal disturbance, and mostly the assemblage appears to have been recovered from close to where originally discarded.

As with most lithic assemblages, the majority of the pieces are typologically undiagnostic and, with an absence of secure contextual associations, dating must rely on their intrinsic technological attributes. Although some ambiguity must be allowed for, consideration of the technological approaches represented by the assemblage, and to a lesser

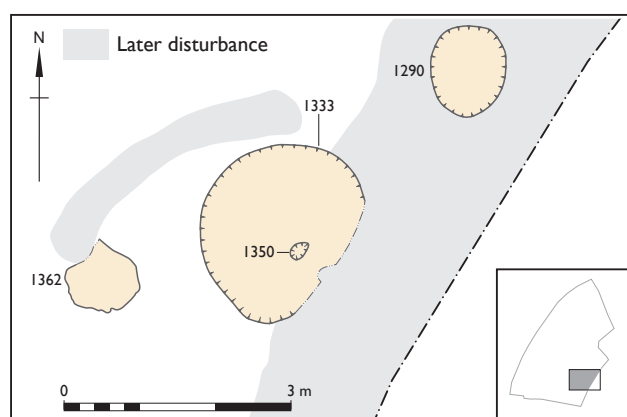


Fig 29 Plan showing the four features of Phase 1a in Area A.

Table 2 Quantification of lithic material.

Trench	Decortication Flake	Core Tablet	Rejuvenation / Mass reduction Flake	Chip (flakes <10mm)	Flake	Non-prismatic Blade	Prismatic Blade	Flake Fragment <10mm	Flake Fragment >10mm	Core	Conchoidal Chunk	Retouch	Unworked Burnt Stone (No.)	Unworked Burnt Stone (wt:g)
Trench A	17	2	5	14	25	4	16	11	7	11	6	14	17	2
Trench B	2	0	1	3	1	1	2	1	1	4	3	4	2	0
Trench C	1	0	0	1	2	0	0	0	0	2	0	0	1	0
Total No.	20	2	6	18	28	5	18	12	8	16	9	19	20	2
Total %	12.4	1.2	3.7	11.2	17.4	3.1	11.2	7.5	5.0	9.9	5.6	11.8	12.4	1.2

Table 3 Summary catalogue of recovered lithic material by Phase and excavation area. Material stratified in features of Phase 1a is shown in bold italics.

Phase	Area	Context	Sample	Decorative Flake	Core Shaping / Mass reduction Flake	Chip	Flake	Non-prismatic Blade	Prismatic Blade	Flake Fragment	Core	Conchoidal Chunk	Retouch	Unworked Burnt Stone (No.)	Unworked burnt stone (wtg)	Suggested Date	Comments	Nos per phase
0	A	1101	9436	1						1						Undated	Flake fragment is burnt	3
		1278							1							Meso/Eneo		
1a		1291	4816						2							Meso/Eneo	Small, 10mm wide, bulbar end missing	5
		1291	4816									1				Undated	Shattered core fragment	
		1291					1									Meso-EBA		
		1333	4841				1									Meso/Eneo	Possibly an attempt at micro-burination	
1b		1279	4808				1		3							Meso/Eneo		16
		1279	4808					1								Meso-EBA		
		1279	4808			1	1		3							Undated		
		1279										1				Meso	Truncated blade	
		1279					1									Meso-EBA		
		1314	4842						1							Undated	Burnt fragment	
		1335		1												Undated	Detached partly along a thermal fault	
		1343	4837			1										Undated		
		1353					1									Meso-EBA		
1c		1296	4810		1				2	1	1		1			Meso/Eneo	Fine serrated prismatic blade. Opposed platform blade core.	19
		1296	4810				2				1					Meso-EBA	Opposed platform blade core	
		1296	4810			2				3						Undated		
		1296									1					Meso/Eneo	Single platform blade core	
		1296		1			2						1			Meso-EBA	End scraper. Two large flakes 34X40X8mm and 73X54X13mm	
2		1201	4794	2		1	1			4	1					Meso-EBA	Multiplatform flake core	42
		1201									1					Neo/BA	Multiplatform flake core	

Table 3 (continued) Summary catalogue of recovered lithic material by Phase and excavation area. Material stratified in features of Phase 1a is shown in bold italics.

Phase	Area	Context	Sample	Decorative Flake	Core Shaping / Mass reduction Flake	Chip	Flake	Non-prismatic Blade	Prismatic Blade	Flake Fragment	Core	Conchoidal Chunk	Retouch	Unworked Burnt Stone (No.)	Unworked burnt stone (wtg)	Suggested Date	Comments	Nos per phase
		1222	4797	2	1	6	5		3	3		1	1			Meso/ENeo	Core tablet. Piercer	
		1222	4797										1			Meso	Microlith	
		1288	4796	2	1	2			1	2	1					Meso/ENeo	Pyramidal blade core.	
		1288	4796								1					Meso	Removes part of a blade producing platform	
		1288			1											Meso/ENeo		
3		1126									1					Undated	Minimal / testing piece	2
		1255										1				Undated	Shattered pebble	
4		580	8363										1			Meso/ENeo	Cortically backed knife	5
		1164							1							Meso/ENeo	Distal end missing	
		1237					1				1					Meso-EBA	Flake is burnt	
		1270					1									Undated		
5		1100										1				Undated	Thermal fragment with one conchoidal facet	2
		1152	4760				1									Meso-EBA		
6		823	4613			1										Undated		6
		826										1				Undated	Disintegrated core?	
		872	4634				1									Meso/ENeo	Blade-like flake	
		941	8356						1							Meso/ENeo		
		1168														Meso-EBA	Possibly from a blade	
		1360								1						Undated		
7		987	8281										1			Meso	Truncated blade made with a crested blade	1
8		659		1												Undated		1
10		892												1	5	Undated	Burnt flint pebble fragment	4
		1296		3												Undated	Struck from a tertiary pebble	
		1312					1									Meso/ENeo	Blade-like flake	

Table 3 (continued) Summary catalogue of recovered lithic material by Phase and excavation area. Material stratified in features of Phase 1a is shown in bold italics.

Phase	Area	Context	Sample	Decortication Flake	Core Shaping / Mass reduction Flake	Chip	Flake	Non-prismatic Blade	Prismatic Blade	Flake Fragment	Core	Conchoidal Chunk	Retouch	Unworked Burnt Stone (No.)	Unworked burnt stone (wtg)	Suggested Date	Comments	Nos per phase
11a		442	4099							1						Undated	Very small fragment, possibly a medial section of a blade	1
11b		369					1					1				Meso-EBA		2
12		329	4051										1			Meso-EBA	Edge retouched flake	
		336					1									Meso-EBA		
		392	4070							1						Meso-EBA	Distal end of a possible blade	
		431		1												Undated		
		459	7438										1			Meso/ENeo	Edge retouched, prismatic blade	
15		1									2					Meso/ENeo	Irregular opposed platform blade core. Angular chunk with a single blade producing platform at front.	5
		145		1												Undated		
		284			1											Undated		
		389					1									Meso-EBA	Distal missing	
		+		1				1								Meso-EBA	Decortication blade	
6	B	2498	4380									1				Undated	Core fragment.	3
		2498	4380					1								Meso/ENeo	Distal end of a probable micro-blade 6mm wide	
		2498	9534			1										Undated	Micro-debitage flake 7mm long	
11		2456	8361								1					Meso/ENeo	Exhausted, bifacially and centripetally worked thin disk-shaped core	4
		2546	8685					1								Meso/ENeo	Systematically produced, distal missing >28X9X3mm	
		2560									1					Meso/ENeo	Exhausted single platform front and side type blade core.	
		2562	8682					1								Meso/ENeo	Cortical 'backing along left margin and some damage to right lateral margin, but could be post-depositional.	
14		2234	7935										1			Meso	Microlith	1
16		2145											1			Undated	Battered edges - used as hammerstone?	4

Table 3 (continued) Summary catalogue of recovered lithic material by Phase and excavation area. Material stratified in features of Phase 1a is shown in bold italics.

Phase	Area	Context	Sample	Decoratation Flake	Core Shaping / Mass reduction Flake	Chip	Flake	Non-prismatic Blade	Prismatic Blade	Flake Fragment	Core	Conchoidal Chunk	Retouch	Unworked Burnt Stone (No.)	Unworked burnt stone (wtg)	Suggested Date	Comments	Nos per phase
		2191			1											Undated		
		2247											1			Meso-EBA	Heavily utilized/battered edge flake	
		2371									1					Undated	Small multiplatform	
17		2109	4214							1						Undated		3
		2202	4231													Undated	Micro-debitage	
18		2114					1									Neo/BA?	Large, hard hammer struck, iron stained	4
		2114									1					Undated	A few flakes removed from one end of a rounded cobble.	
		2125		1												Undated		
		2146	4226							1						Undated	Small fragment	
19		2028		1								1				Undated	Core or flake fragment	7
		2076										1				Undated	Battered edges - used as hammerstone?	
		2112												1	3	Undated	Burnt flint or chert	
21		2001		1						1				1	20	Undated	Decoratation is very large 50X108X20mm of iron-stained cherty flint. Burnt stone is slate-like	23
10	C	3133	4453				1									Undated		1
12		3081	8464								1					Meso/E/Neo	Opposed platform front type blade core with rejuvenated platforms. Very exhausted.	2
		3081	8463								1					Undated	Exhausted flake core - all surfaces conchoidal. Incipient Hertzian cones on one side.	
14		3065	4423			1										Undated	Micro-debitage flake 4mm long	1
15		3049			1											Undated	Thick core shaping flake	1

extent the use of raw materials and the size of individual pieces, it is possible to divide the assemblage into two distinct industries. By far the largest group can be dated to the Mesolithic period, whilst a smaller number of flakes and retouched implements are more characteristic of Later Neolithic or Early Bronze Age industries.

Mesolithic

The Mesolithic assemblage is dominated by pieces reflecting a competent blade-based reduction strategy that involved the careful preparation of cores to enable the repeated removal of standardised flakes and blades. This strategy can be dated to no later than the Early Neolithic period, but the presence of microliths and truncated blades, combined with the general technological ‘feel’ of the assemblage, indicates that most and perhaps all of the pieces belong to the Mesolithic period.

Raw materials

The Mesolithic assemblage was manufactured from a very wide variety of raw materials. Without detailed petrological analysis it is very difficult to provide precise identifications of the types of stone and hence their sources, and even then much ambiguity can remain as to the exact provenance of particular pieces of raw material. Nevertheless, the majority of pieces are made from flint and this can be divided into two main types. Approximately half of the pieces appear to be made from small sub-angular cobbles of rather poor knapping quality ‘glassy’ flint of a variety of black, brown, grey or yellow hues. Such flint is present in the glacial tills found across much of the region or as redeposited material in alluvial deposits, including those of the River Dee immediately to the south of the site; other potential sources include beach or marine deposits present along the coast. The second type of flint, which has contributed around a third of this assemblage, is a distinctive opaque ‘stony’ or porcelain-like, light-grey or white flint which has a thin but rough cortex. It is comparable to ‘Wolds’ flint found in and around the chalklands of the Yorkshire and Lincolnshire Wolds and therefore must have been transported across the Pennines. The remainder of the Mesolithic material is made from a variety of coarser-grained, ‘stony’ or matt cherts that vary considerably in colour and include white, brown, dark grey and black. Chert is found with the limestone throughout northern and western Britain, and the wide variety present suggests that the pieces here originate from a number of different sources. The most common type is dark grey with fine laminations and is very reminiscent of the ‘Gronant chert’ from north Wales that can be found along the western side of the Dee estuary (eg Berridge 1994). Along with cherts from other areas, this is often present in Mesolithic lithic assemblages from Cheshire (below p 43). Some of the other types are more reminiscent of Pennine cherts (*cf* Hind 1998; Evans *et al* 2010; Preston 2013) and there are also a few flakes of a greenish stone that appear rhyolitic and are macroscopically similar to the volcanic

tuffs of the central Cumbrian fells. This material was most notably used for the production of vast numbers of stone axeheads during the Neolithic period but was also utilised during the Mesolithic period, most likely in the form of glacial erratics or river cobbles (Bradley and Edmonds 1993; Cherry 2009; Preston 2013).

Cores (Fig 30)

- 1 Single platform pyramidal blade core made from a lustrous white chert or coarse-grained Wolds flint with bluish tinges. Weight 31 g. A (1288): Phase 2, upper cultivation soil.
- 2 Fragment of a single platform blade core worked from the front made from a lustrous, possibly heat-treated, white chert or coarse-grained Wolds flint with fine black speckling and a thin hard red cortex. Weight 9 g. A (01): Phase 21, topsoil/ early excavation backfill.
- 3 Opposed platform blade core worked on the front and side of a spall of coarse-grained lustrous white chert. Weight 9 g. A (1296): Phase 1c, lower cultivation soil.
- 4 Multi-platformed flake core worked from the front and side made from a coarse-grained light greyish chert with smooth brown cortex. Weight 19 g. A (1201): Phase 2, upper cultivation soil.
- 5 Opposed platform blade core worked on the front and side and with one of the platforms removed by a plunged blade. Made from a laminated medium-grained black stone, possibly ‘Gronant chert’. Weight 16 g. A (01): Phase 21, topsoil/ early excavation backfill.
- 6 Opposed platform blade core worked on all sides and made from ‘glassy’ stripy grey translucent flint with rough cortex. Weight 8 g. C (3081): Phase 12, post-Roman deposit.
- 7 Opposed platform blade core worked on the front and side that had broken in half, possibly during reduction. It is made from a fine-grained lustrous opaque blue/grey flint or chert. Weight 9 g. A (1296): Phase 1c, lower cultivation soil.
- 8 Single platform blade core worked on the front and side and made from a fine-grained lustrous opaque stripy blue/grey flint or chert. Weight 7 g. B (2560): Phase 11b, robber trench backfill.
- 9 Single platform blade core worked from the front but with failed attempts to establish a new platform on the back. It is made from a poor knapping quality opaque grey-brown flint with thin and worn cortex. Weight 13 g. A (1296): Phase 1c, lower cultivation soil.

Most of the cores recovered probably belong to the Mesolithic period and these encompass a wide range of raw materials. Eight cores have clearly produced blades and comprise four with opposed striking platforms (Fig 30 nos 3, 5, 6, 7), three with single platforms that have flakes removed either from the front (Fig 30 nos 2, 9) or from the front and side (Fig 30 no 8), with the remainder

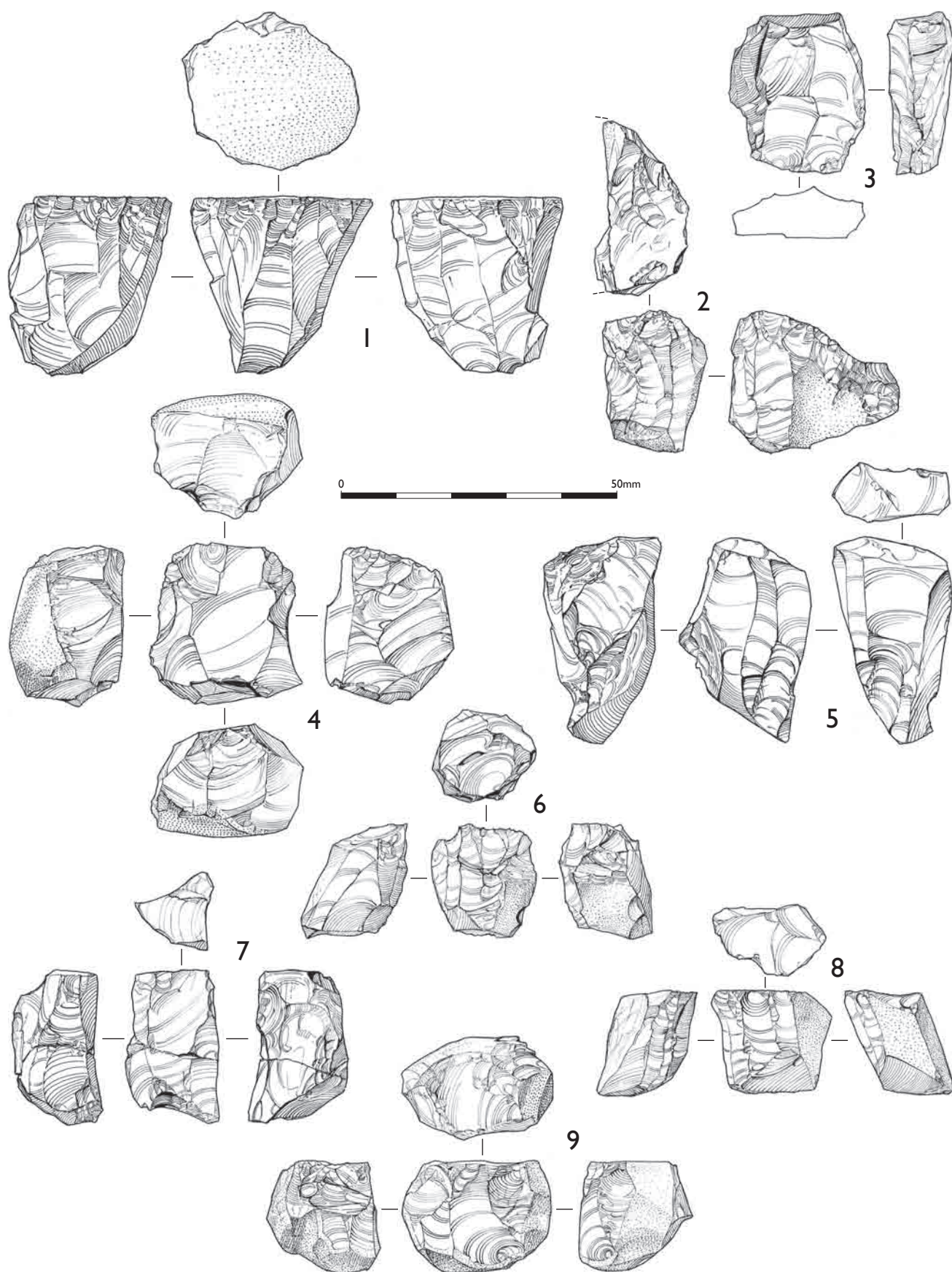


Fig 30 Mesolithic cores.

being classic pyramidal cores with a single platform that has been worked around the entire perimeter (Fig 30 no 1). They have all been worked down to a considerable extent and towards the end of their productive lives would have produced tiny flakes and blades not exceeding 10–20 mm in length. They average just 13 g in weight with the largest being 31 g and the smallest 7 g. Despite their diminutive size, they do show considerable skill in reduction as well as a concern to maximize the productive capabilities of the raw materials, with most displaying evidence of careful maintenance and rejuvenation.

The majority of the flake cores have multiple striking platforms and are also heavily worked; this at least partly reflects the probable continued working down of blade cores once blade production was no longer tenable (eg Fig 30 no 4). Two have only been minimally worked and may reflect tested and discarded raw materials.

Flakes and blades (Fig 31)

The Mesolithic pieces are notably small, no doubt reflecting the sizes of the raw materials and the desire to make full use of what were probably regarded as premium resources. There are too few complete pieces to enable meaningful statistical analysis of the assemblage's metrical and

technological attributes but some observations are worth noting. The largest blade is a crested example which measures 51 mm long and would have been longer had it not been deliberately truncated (Fig 31, no 12). However, none of the other blades measures over 45 mm in length and the complete examples are on average just 29 mm long and 11 mm wide. With a few exceptions (see below) the flakes are similarly diminutive, the majority being under 30 mm in maximum dimension and the greatest proportion being within the 10–20 mm range. Around a fifth of the assemblage comprises core-trimming flakes and fragments less than 10 mm in dimension. Many have attributes indicative of blade-based reduction strategies and these indicate that stone was actually being worked at the site during the Mesolithic. The presence of decortication flakes, core preparation and maintenance pieces, such as core tablets and a crested blade, and discarded cores and retouched implements, indicates that the full reduction sequence was undertaken, from the initial testing and reduction of cores to the discard of used tools.

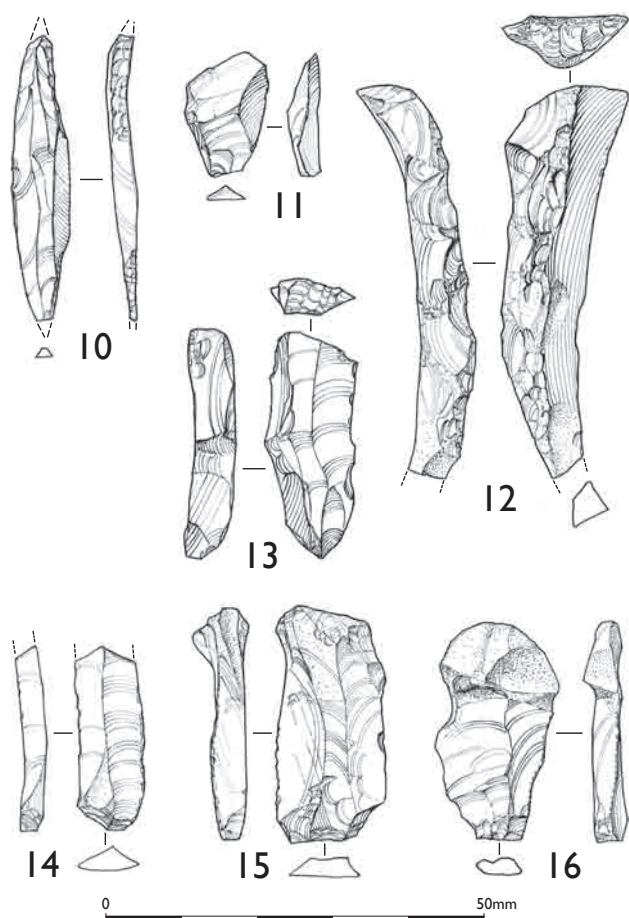


Fig 31 Mesolithic flakes and blade.

- 10 Slender bi-truncated microlith struck from an opposed platform micro-blade core. It is made from a fine-grained opaque white flint with very thin but rough brownish cortex, very comparable to Yorkshire/Lincolnshire Wolds flint. B (2234): post-Roman deposit.
- 11 Wide and short obliquely truncated microlith made from a 'glassy' translucent black flint. A (1222): Phase 2, upper cultivation soil.
- 12 Crested blade with oblique distal truncation made from a 'glassy, opaque yellow-grey flint. A (987): Phase 7, deposit outside wall of Amphitheatre 1b.
- 13 Blade with oblique distal truncation made from a 'glassy, opaque yellow-grey flint. A (1279): Phase 1c, lower cultivation soil.
- 14 Bulbar end of a blade with fine edge-retouch struck from an opposed platform blade core. It is made from a 'glassy' semi-translucent light-honey coloured flint. A (459): Phase 11b, robber trench backfill.
- 15 Very finely serrated blade with up to 25 serrations per cm, made from an opaque mottled dark grey / light grey cherty flint with pinkish tinges. A (1296): Phase 1c, lower cultivation soil.
- 16 Very finely serrated blade with up to 25 serrations per cm, made from a 'glassy' opaque light grey flint. A (1288): Phase 2, upper cultivation soil.

Diagnostic Mesolithic implements from the site include two microliths; a slender bi-truncated point (Fig 31 no 10) and a wide but short obliquely truncated point (Fig 31 no 11). With only two examples, it is impossible to confidently date the assemblage using microlith typology, not least because they may belong to separate periods of occupation. It is perhaps worth noting, however, that both can be regarded as broad blade types that are more reminiscent of those from early to middle Mesolithic assemblages than

from later ones. They can, for example, be matched by examples from 'Deepcar' assemblages such as those from Warcock Hill North (Radley and Mellars 1964, fig 8). Also diagnostically Mesolithic in date are two blades with obliquely truncated distal ends, the retouch being similar to that used for the microliths (Fig 31 nos 12, 13). Truncated blades are commonly found in Mesolithic tool kits and fine edge damage on the examples here may support the notion that they were used as boring or graving implements (*cf* Ellaby 2004, 20). Complementing the probable use of many microliths as projectile points, it has also been suggested that backed and truncated blades may have been used in the manufacture of arrow shafts (R Jacobi, pers comm). There are also a number of lightly edge-trimmed or utilised blades (eg Fig 31 no 14) and two very finely serrated blades (Fig 31 nos 15, 16), all of which can be placed within the Mesolithic assemblage and which were most probably

used for a variety of tasks involving cutting or fine sawing. Interestingly, both serrated pieces have cortical distal ends, possibly used to aid hafting or handling.

Late Neolithic / Early Bronze Age (Fig 32)

- 17 Non-prismatic edge-trimmed blade of 'glassy' black translucent flint with thick cortex. A (580): Phase 4, primary seating bank of Amphitheatre 1a.
- 18 Flake with inverse flaking and utilization damage, made from a 'glassy' mottled translucent black /opaque grey flint. A (1296): Phase 1c, lower cultivation soil.
- 19 Distal portion of an end-and-side scraper made from a 'glassy' mottled translucent black /opaque grey flint A (1296): Phase 1c, lower cultivation soil.
- 20 Centripetally and bifacially worked implement made from a 'glassy' mottled translucent black /opaque grey flint. B (2456): Phase 11b, robber trench backfill.

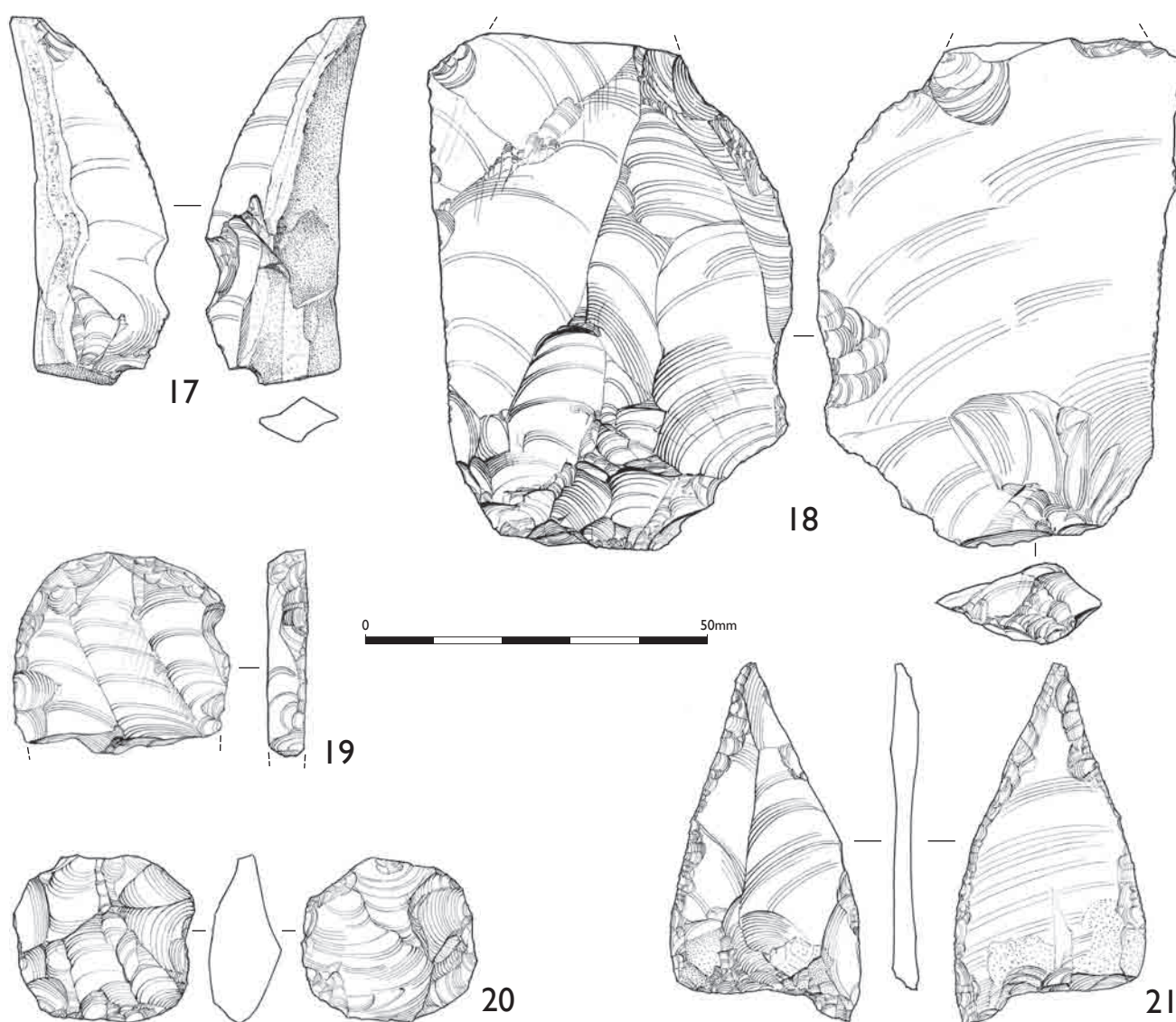


Fig 32 Late Neolithic/ Early Bronze Age lithics.

- 21 Oblique transverse arrowhead made from a 'glassy' mottled semi-translucent grey flint. Matthews' Trench VII (M16): from the backfill of Thompson's excavation (Matthews *et al* 2001c, 68–70, SF 4).

Amongst the assemblage are a small number of pieces that stand out from the others due to both their size and their technological attributes. They comprise relatively thin flakes with narrow and carefully edge-trimmed and sometimes faceted striking platforms. They have been competently produced but, unlike the Mesolithic pieces, are not the results of systematic reduction strategies and instead are most characteristic of Later Neolithic or Early Bronze Age flint working techniques. Interestingly, they are nearly all made from a 'glassy', translucent, black flint with opaque grey mottling which has a thick, rough and relatively unweathered cortex. This is typical of the good knapping-quality flint found in the chalk of southern and eastern Britain, and its cortex indicates that, whilst not mined, it must have been obtained from superficial deposits on or close to the parent chalk (Gibbard 1986). Possibly associated with these is an exhausted multi-platformed core that is made from an opaque grey flint with an orange band immediately below its smooth worn cortex. It is visually comparable to the glauconite-coated nodules of the 'bullhead beds' that can be found at the base of Tertiary deposits that overlie the chalk in southern and eastern Britain (Shepherd 1972). The size of the raw materials is notable; many of the flakes assigned to this industry are significantly larger than those of the Mesolithic assemblage with the largest, a decortication flake, exceeding 100 mm in width.

The most notable retouched piece belonging to this group is a large and finely made oblique transverse arrowhead, a type diagnostic of Later Neolithic industries and often associated with Clacton and Durrington Walls styles of Grooved Ware pottery (Clark 1935, type I; Green 1980). It has been made by obliquely truncating a narrow non-Levallois flake and has steep bifacial retouch forming a slight barb at its base, abrupt retouch along the truncated side and sporadic shallower retouch along the primary flake edge, which is also the shorter of its sides (Fig 32 no 21). Its presence here is of interest as these are not common implements and none are actually recorded in the Chester area on Green's distribution map (1980, fig 41).

Other retouched implements of a similar date include a non-prismatic blade with fine retouch and wear from being used as a cutting implement (Fig 32 no 17). Its opposite margin has cortical 'backing' and there is also a small notch cut close to the bulbar end, which could have acted as a finger hold. Also typical of this period is a large flake with a faceted striking platform that shows inverse invasive flaking and clear traces of utilisation (Fig 32 no 18). From the same context is the distal end of a scraper (Fig 32 no 19). This example is a 'horseshoe' type made on a large blade-like flake which has a small notch cut

into its right margin and has evidently been re-sharpened. Scrapers are generally poorly dateable although well-made and symmetrical types such as this are most typically found in Later Neolithic or Early Bronze Age contexts. Also of note is an unusual disk shaped implement made on a large flake that has been centripetally and bifacially worked. It is reminiscent of a Levallois-type core but is much too small to have been used as such, and is also comparable to unpolished discoidal knives, although again is much smaller than may be expected for such implements. Without obvious comparisons its dating remains problematic but bifacial working techniques are much more common in the Neolithic and Early Bronze Age than previously, and the raw materials might also hint that it belongs to the later flint-working traditions witnessed at the site than during its Mesolithic phase (Fig 32 no 20).

Discussion

There are too few diagnostic implements to further refine the dating of the Mesolithic occupation. The bi-truncated point made from Wolds flint would on both typological and raw material criteria sit comfortably within early-middle Mesolithic 'Deepcar' assemblages (Myers 1987; 1989), but the size of most of the blades and the cores would be more typical of later industries. A later date may also be more in accordance with the wide range of raw materials evidently employed to manufacture the assemblage (Jacobi 1978; Myers 1989; 2006). It is quite possible that the assemblage represents more than a single episode of occupation at what must have been a prime location. It is perhaps significant that many of the implements here are larger than any of the cores. This suggests that either the former were brought to the site or that the cores from which they were made had been taken away. The cores that were left behind are incredibly well worked-down and had been abandoned only after they had been fully utilised. Together the discarded implements and cores suggest complex patterns of movement of people and things to and from the site and probably extending to many other places within the landscape.

Discussion: The Mesolithic to Bronze Age evidence in its wider context

By Dan Garner

Mesolithic

The archaeological resource assessment for north-west England sums up the evidence for Mesolithic activity in Cheshire in a single paragraph which mainly covers the northern part of Wirral including the sites of Greasby, Thurston and Irby (Cowell 1992, Philpott and Adams 2010). The resource for the rest of the county is covered in two sentences:

'South of the Mersey the Triassic sandstone mid-Cheshire ridge forms the focus for Mesolithic sites, a small number of which

have been located by fieldwalking around Frodsham (Varley 1964, Longley 1987). A little to the south, four separate flint scatters from fields around the village of Ashton include both early and later forms (Leach 1942)' (Hodgson and Brennand 2006, 27).

Whilst it was not the intention of the resource assessment to provide a detailed account of Mesolithic sites in north-west England or indeed Cheshire, it is clear that the potential of the county was considered low by comparison with its neighbours to the north. Indeed proximity to the modern coastline or upland cave sites appears to have been thought of as a guide to the areas of greatest potential in the region.

The North-West Wetlands Survey volume for Cheshire (Leah *et al* 1997) offers a brief discussion of the early prehistory of the modern county of Cheshire. Attention is drawn to an early Mesolithic site at Tatton Park which produced an assemblage initially underestimated at *c* 900 flints and was interpreted by the excavator as a temporary camp (Higham 1993, 15). The potential for other similar sites in stream or river-side locations was considered to be 'almost certain', but it was acknowledged that they were largely invisible to surface archaeological survey (Leah *et al*, 1997, 146). The discussion identified that the location of the closest known sites which might have been used as 'base camps' was beyond the modern county boundaries on the sandstone ridges of north Wirral (Cowell and Innes 1994). The location of similar possible 'base camp' sites on Cheshire's central sandstone ridge was also explored with reference to surface scatters of lithic material from Harrol Edge near Frodsham, Ashton, and Alderley Edge (Longley 1987, 40), these three sites being atypical of the usual county pattern of single find spots. It was acknowledged that insufficient published data was available to allow an early or late Mesolithic designation for the Cheshire sites and in summary it was stated:

'Whatever the truth of the matter, the evidence suggests, at present, that the most significant early Mesolithic evidence in lowland Cheshire is likely to be found in areas where solid geology outcrops through the glacial drift deposits, with the drift-mantled areas producing evidence of less intensive exploitation' (Leah *et al* 1997, 147).

The Cheshire wetlands survey failed to identify significant assemblages of Mesolithic material at any of the sites investigated but did identify which wetland sites had the potential to produce early post-glacial palaeoecological profiles. This form of evidence was thought to have the greatest potential to demonstrate early Mesolithic activity in the region even where little or no artefactual evidence existed. This was primarily through indicators of vegetational change probably caused by human agency such as the change from wooded to open mire environment at Walkers Heath between 8,955–8,258 cal BC (OXA-6139) and 8,420–8,061 cal BC (OXA-6140) (Leah *et al* 1997, 148). The record implied that fire (evidenced by charcoal) had been a factor affecting the county's mires from the early

prehistoric period onwards; although it was not possible to ascertain if these fires were anthropogenic or natural in origin (Leah *et al* 1997, 150).

The archaeology of the Mesolithic in the region is overwhelmingly dominated by lithic scatters recovered from field walking. Typically this means that sites are relatively numerous, almost all are unstratified and only a tiny number have been excavated. The closest sites to Chester are briefly reviewed below:

Harrol Edge: The Harrol Edge Group comprises 1,892 flint and chert artefacts collected from fields in the vicinity of Woodhouse hill-fort, near Frodsham, in the 1950s (Brooks 2016, 22). 1,595 artefacts were ascribed to the Harrol Edge site itself, and the majority of the assemblage was of flint, although 135 artefacts (8.6%) were of a dark Carboniferous chert. The flint which dominated the assemblage is distinctive, with a series of dark and lighter bands and where the cortex survives it is worn suggesting that it was collected from a derived source such as the glacial till or gravel from the local river terraces. The Carboniferous chert, however, could have been imported to the site from either the Peak District or from North Wales (Hind 1998), both of which have suitable deposits.

The bulk of the assemblage is knapping waste with a range of flakes, blades and cores being recovered. These include 232 blades or blade fragments of which 63 are of Carboniferous chert, the size of which suggest a Late Mesolithic date. A total of thirty-four tools, which were largely of the banded flint, were recovered, the vast majority of which were fairly crude small scrapers. The size and morphology of these tools suggest they are largely Late Mesolithic in form. The remainder of the tool assemblage contains small numbers of a range of tools and retouched pieces including three truncated blades, eight, small retouched fragments and a possible awl. However a few artefacts suggest a level of later activity within the area. These include a plano-convex knife and the fragment of a leaf shaped arrowhead, both of which would suggest a Neolithic presence.

The Seven Lows: During the summer of 2012 the Habitats and Hill-forts Project (Garner 2012, Garner, D *et al* 2016) undertook an excavation on a de-scheduled round barrow in the Seven Lows barrow cemetery in Delamere (CHER 840/1/7). During the excavation a dispersed scatter of lithics was recovered (Brooks 2016). A total of 257 flint and chert artefacts was recovered (11.1%) and the assemblage is dominated by knapping debris with only nine (3.1%) tools. The majority of the assemblage is broken flakes (101, 34.9%) and fragments (25, 8.7%) of flint, with complete flakes only forming 28% of the assemblage. Five of the tools were microliths or microlith fragments. Two of these were obliquely blunted points on narrow bladelets and a third a crude scalene triangle made of a pale chert. The other microlith fragments are probably from obliquely blunted

point types, all having been made on narrow bladelets. Very limited evidence for the production of microliths on the site is suggested by the recovery of a single, distal, microburin. A single crude scraper and one further retouched blade fragment were also recovered.

The choice of raw materials within the assemblage would suggest that relatively local, derived deposits were being exploited, though the presence of thirty-two partly worked cobbles suggests that it was economic to bring unmodified materials back to the site and therefore the extraction site may not be far from the excavated area. It is likely that a gravel deposit derived from materials associated with the Irish Sea Till was being exploited. This derived source may also explain the low numbers of other raw materials.

Beeston Castle: The lithic assemblage from the 1968–85 excavations (Ellis 1993) comprised 862 pieces of flint (flakes of rock crystal were also recovered). The assemblage was described as wholly residual and the debitage was thought to have too few complete flakes or whole cores to ascribe even a loose date. The dateable Mesolithic material comprised five tools including two microliths, two worked blades and a blade scraper end (Smart 1993, 56–59). However, most of the Beeston assemblage was probably post-Mesolithic and hard to date.

Carden Park: The Carden Park rock shelter was discovered in 1985, when a small collection of flints were found in the opening of a rabbit burrow; these were identified as including some blades and core-trimming flakes of later Mesolithic type. The flint artefacts had come from a mound of soil in front of a rock overhang, modified to form a small cave. Subsequently, a joint project between Chester Archaeology (Keith Matthews) and the University of Liverpool (Anthony Sinclair) undertook a research excavation at the rock shelter over five seasons between 1996–2000. Almost 10,000 pieces of chert and flint, including a few tools and a great deal of waste material, were recovered from the site. Virtually all the tools conformed to the later Mesolithic ‘narrow blade’ tradition, which can be dated *c* 6800–4300 Cal BC. Analysis began in 1998 and suggested that the type of occupation that took place here was specialised, as most of the tool forms are projectile points (Matthews 2006).

Poulton: The long-running Poulton Research Project has to date recovered 273 pieces of chert and flint mainly comprising blades, scrapers and cores which are broadly dated to the Mesolithic period (Cootes *et al* 2017, 14–19). However, the Poulton assemblage was residual in nature and much of it is probably post-Mesolithic or hard to date.

To these sites should be added two significant sites from east Cheshire:

Tatton Park: The Mesolithic material from the Tatton Park project eventually produced a total of 8,187 pieces of flint/ worked stone of which waste accounted for 8,066 pieces; and only 1.5% of the pieces represented identifiable tools (Higham and Cane, 1999, 16). In terms of raw material, the authors describe the bulk of the objects as being flint, in a spectrum of colours from white to dark grey and black and from honey to red. As at the amphitheatre, the assemblage has affinities with early-middle Mesolithic ‘Deepcar’ assemblages (above, p 40), and much of the flint could have come from the Wolds of east Yorkshire and Lincolnshire (although it was acknowledged that the flint could also have been derived from local glaciofluvial deposits). Less than 2% of the Tatton material was bedded chert and this was thought to be derived from the Carboniferous Limestone of Derbyshire or West Yorkshire. The assemblage was characterised by 41 broad-blade microliths (29 of which were obliquely blunted), 45 scrapers, 37 worked-out cores and a small collection of other tools including the sharpening flake from a tranche axe. Some of the tools were being manufactured on site, as evidenced by the presence of seven micro-burins in the assemblage. The dominance of obliquely blunted pieces and processing tools were thought to represent a ‘balanced assemblage’ which was attributed to the early Mesolithic period *c* 8300–6800 BC (Higham and Cane 1999, 18).

A small assemblage of characteristically late Mesolithic material in the form of narrow-bladed flint microliths was also recovered from the Tatton Park site, again implying, as at the amphitheatre, successive re-use of a favourable location in the landscape. Pollen analysis of a peat core from Tatton Dam identified a vegetational change at 5540–5245 cal BC (HAR-8410), moving from fairly open hazel, willow and pine woodland to a more closed deciduous woodland of alder, oak, lime and elm; pollen of grasses, sedges and marsh or bogland plants also became more numerous (Higham and Cane 1999, 29).

Alderley Edge: The Mesolithic material from Alderley Edge consisted of flint, chert and worked stone recovered from two main sites at Engine Vein (136 pieces) and Castle Rock (496 pieces) (Cowell 2005, 20). The raw material was analysed based upon colour, texture and lustre, and some 18 different categories of chert and 17 of flint were identified in the two assemblages. It was suggested that the raw material represented a similar pattern of distribution to that evidenced at Tatton Park. In particular, a type of white patinated flint was found to be present. On this basis at least some of the assemblage was dated to the early Mesolithic period (*c* 8500–7000 BC) (Cowell 2005, 22). The remaining flint in the assemblage was probably derived from the local glacial till whilst the bulk of the chert was thought not to be local and to be derived from the Pennine area of Derbyshire. The range of locally derived flint types in the assemblage suggested an element of late Mesolithic (*c* 6000–4000) material in the assemblage as

well. The assemblages included 19 cores of which 14 were blade cores, there were also 7 core rejuvenation flakes and, as at the amphitheatre, the general tendency seems to have been for both flint and chert cores to be worked-out (Cowell 2005, 27). Only four microliths were identified in the assemblages but of these three had obliquely blunted points and this was thought to suggest an early Mesolithic component to the occupation (Cowell 2005, 28).

A recent study of the Mesolithic in western Britain (Bell, 2007) was primarily focused on the coastal and maritime aspects of Wales and parts of Southwest England (including the Severn Estuary, Bristol Channel and north Devon) as well as the wetlands of Merseyside including Wirral. From a Cheshire perspective the area of the study is somewhat frustrating as the study area was delimited by the eastern edge of the modern Welsh border, and an arbitrary line running east-west below the course of the River Mersey (Bell 2007, 15 fig. 1.7). As a result the only part of Cheshire to be given any consideration was the northern part of the Wirral Peninsula. The reasons for these arbitrary boundaries were largely pragmatic and based upon work on the Merseyside volume of the North-West Wetlands Survey (Cowell and Innes 1994).

Nevertheless, a number of interesting trends were identified within the study, with implications for the Chester and Cheshire area. Primarily this is with regard to annual territories, patterns of movement and possible boundaries between groups, and it is suggested that raw materials could be used to deduce such patterns. At the amphitheatre site the range of raw material indicates a complex pattern of mobility or exchange, and allows for the possibility that the movement of people extended not just from the lowlands and up into the Pennines (eg Jacobi *et al* 1976 310; Evans *et al* 2010) but from coast to coast (*cf* Preston 2009; 2013). The Wolds flint is indicative of trans-Pennine contact and as well as being used extensively along the eastern side of England, is often the dominant type of raw material used in the southern Pennines (eg Radley and Mellars 1964, 7–8, 18). A similar picture is presented by the cherts, the variety of which suggests sources that potentially extend from Wales through to the Pennines and even beyond. The most common chert at the Amphitheatre was Carboniferous Gonant Chert which outcrops near Prestatyn, North Wales; this has also been found being used on the Wirral suggesting north-easterly movement of some 20 km across the Dee Valley (Bell 2007, 331). The pattern of lithic finds may indicate axial inland movement up river valleys and it has been suggested that groups on the Pennine crest were coming from the Liverpool Bay area over a distance of 50–80 km. Bell also considers the size of territories and proposes that there may have been 12 territorial units within his study area. The average size of those territories where Mesolithic activity is abundant was about 2,700 km²; however, two larger areas are identified in which Mesolithic activity is sparse, one of which was

the Welsh Marches (Bell 2007, 332). Further calculations are attempted for the western Britain study area suggesting an overall population of *c* 2,500 people (a density of 0.05 people per km²) with each territory having an average population of *c* 200 people. These population sizes are considered large for normal hunter-gatherer bands and it is suggested that territories could have been sub-divided into five or ten smaller units which were perhaps based on the river valleys. This statistical analysis could be used to imply that annual territories were more likely to have been 30 to 40 km across (Bell 2007, 332). The size of the annual territorial areas for western Britain suggested above could place the Chester amphitheatre site within the same seasonal round as the Wirral sites of Greasby and Thurstaston to the north; Poulton and Carden Park to the south; Harrol Edge and the Seven Lows to the east; and Prestatyn to the west.

A possible model for seasonal movement has been suggested for western Britain with a main winter camp (November to March) located near the head of an estuary or in a river valley where full advantage could be taken of the large spring salmon making their way upstream. At the onset of spring the camp would have moved to the coast where a milder frost-free climate would have promoted early plant growth. Movement to upland areas would have been at the mildest time of the year (June to August) and was probably followed by a return to the coast in late August, during which autumn fruit gathering would have begun. The autumn (September to November) coastal camp would have been occupied with fishing and sealing before a return to the winter camp (Bell 2007, 332–4). In this model the site at Chester would be considered neither coastal nor upland and is therefore most likely to have conformed to a winter camp phase of the annual round; whether this was a fixed site in the seasonal cycle or an occasional stopping point cannot be established on the present evidence.

Neolithic / Bronze Age

By Dan Garner and Barry Bishop

The fact that some of the lithic assemblage from the amphitheatre can be seen to be derived from the late Neolithic and possibly the Early Bronze Age is yet another dimension to the prehistoric activity on the site. The nature of occupation is difficult to assess. It is characterised by a few large flakes and a seemingly relatively high proportion of retouched pieces which include a diagnostic transverse arrowhead. Unlike during the Mesolithic occupation, there are not the quantities of debitage present to indicate flint working was being routinely practiced at the site, although it appears that the use of tools was still important. Perhaps its most notable aspect is the use of raw materials which, as with the Mesolithic material, appear to have been brought from afar, although at this time they may have originated from sources close to the southern or eastern chalk-lands. However, the group can be seen as entirely residual with no associated features or stratigraphy. This is in keeping with other finds of this date from across the city and it seems

that further expansion on discussions of this period will have to await future discoveries and research.

IRON AGE SETTLEMENT AND LAND USE (PERIOD 1, Phases 1b–2)

Middle Iron Age settlement (Phase 1b)

This phase was defined by the presence of a single round-house, with an associated four-post structure. The four-post structure had two phases (Fig 33).

The round-house (Building 1)

The plan of this building was defined by two separate lengths of curvilinear gully, though it is clear from the arcs projected from these features that they formed part of the same structure. The diameter of the structure can be estimated at 8.4 m.

The southern gully (1294) was cut into the natural subsoil (1278). It survived for a length of 2.8 m and had a maximum width of 0.32 m and depth of 0.15 m. It was wider and deeper at its southern end where it was cut by the construction trench for the arena wall. The character of the gully would suggest that it had served as a drain (possibly an eaves drip). The primary fill (1330) was a sandy silt with infrequent charcoal flecks. The upper fill (1295) contained more charcoal than the lower fill. The feature was sealed by cultivation soil (1288).

Gully (1352) was exposed for its entire length of 3.8 m. It was 0.5 m wide and 0.2 m deep. Both ends of the gully had rounded, deliberate terminals. The primary, brown silt fill (1353) produced a single sherd of Very Coarse Pottery (VCP), which is salt-making briquetage associated with Iron Age exploitation of the central Cheshire brine springs (p 59). Within the gully fill there were two areas where wood charcoal inclusions appeared more densely, probably representing post-holes (1342, 1344, fills 1343, 1345). The presence of post settings within this gully would suggest that this was actually a construction trench; the well-defined termini also support this suggestion.

There were two possibly associated features. A post-hole $0.4 \times 0.28 \times 0.23$ m (1319) contained a charcoal-rich fill (1320). It may have been a structural element of the round-house. Towards the centre of the round-house entrance was a shallow pit 1340, fill 1341) measuring $1 \times 0.75 \times 0.07$ m.

The four-post structure (Building 2)

Phase (i)

The earliest phase comprises three post-holes making two sides to a square structure $c 3.5 \times 3.5$ m.

Post-hole 1: Sub-circular cut 1.03 m in diameter and 0.58 m deep (1092). The primary fill (1118) of red sandstone fragments, sand and clay, was found principally on the western side of the cut, and represented the packing

around a substantial original post with a diameter of 0.40 m. The bottom 0.25 m of the post-setting was filled with a deposit of silt and wood charcoal (1115), above which was redeposited natural clay (1116), suggesting that the post had been deliberately removed, after which a small deposit of charcoal was placed in the top of the hole (1117), sealed by a mixed brown silty clay (1093).

Post-hole 2: Sub-circular cut (1305) 0.8 m in diameter and 0.64 m deep cut into natural sub-soil (1278). Primary fill (1314) was probably originally set around a timber post and comprised large red sandstone fragments and redeposited natural clay which had some concentrations of wood charcoal. The post-pipe was clearly defined by the packing material and was filled with a friable grey/brown loam (1306). The dimensions would suggest a circular timber post about 0.4 m in diameter.

Post-hole 3: Sub-circular cut (1361) 0.9 m in diameter and 0.6 m deep cut into natural sub-soil (1278). Primary fill (1360) was probably originally set around a timber post and comprised large red sandstone fragments and redeposited natural clay which had some concentrations of wood charcoal. The post-pipe was clearly defined by the packing material and was filled with a friable grey/brown loam (1359). The dimensions would suggest a circular timber post about 0.41 m in diameter.

Phase (ii)

The later phase also comprises three post-holes making two sides to a slightly less regular rectangular structure approx. 3×4 m. This would appear to be a complete rebuild of the earlier structure.

Post-hole 1: Sub-circular cut (1110), 0.90 m in diameter and 0.65 m deep, with steep sides and a flat base, on the bedrock. The primary fills (1109, 1096) of yellow-brown sand may have been the packing for an original post, and a basal deposit of crushed sandstone (1108) may have functioned as a post-pad. The successive fills (1094, 1095) of red and yellowish-grey clay may have been deposited after the post was deliberately removed. Some sandstone packing stones survived towards the top of the feature (1113).

Post-hole 2: Sub-circular cut (1339) 1 m in diameter and 0.55 m deep cut in to earlier post-hole fill (1306). Primary fill (1338) was probably originally set around a timber post and comprised redeposited natural clay which had some concentrations of wood charcoal. The post-pipe was not clearly defined by the packing material and was probably disturbed during the removal of the post. The upper fill was a friable grey/brown loam (1313). No dimensions could be recovered for the size of the timber post.

Post-hole 3: Sub-circular cut (1354) 1.05 m in diameter and 0.6 m deep cut in to earlier post-hole fill (1359). Primary

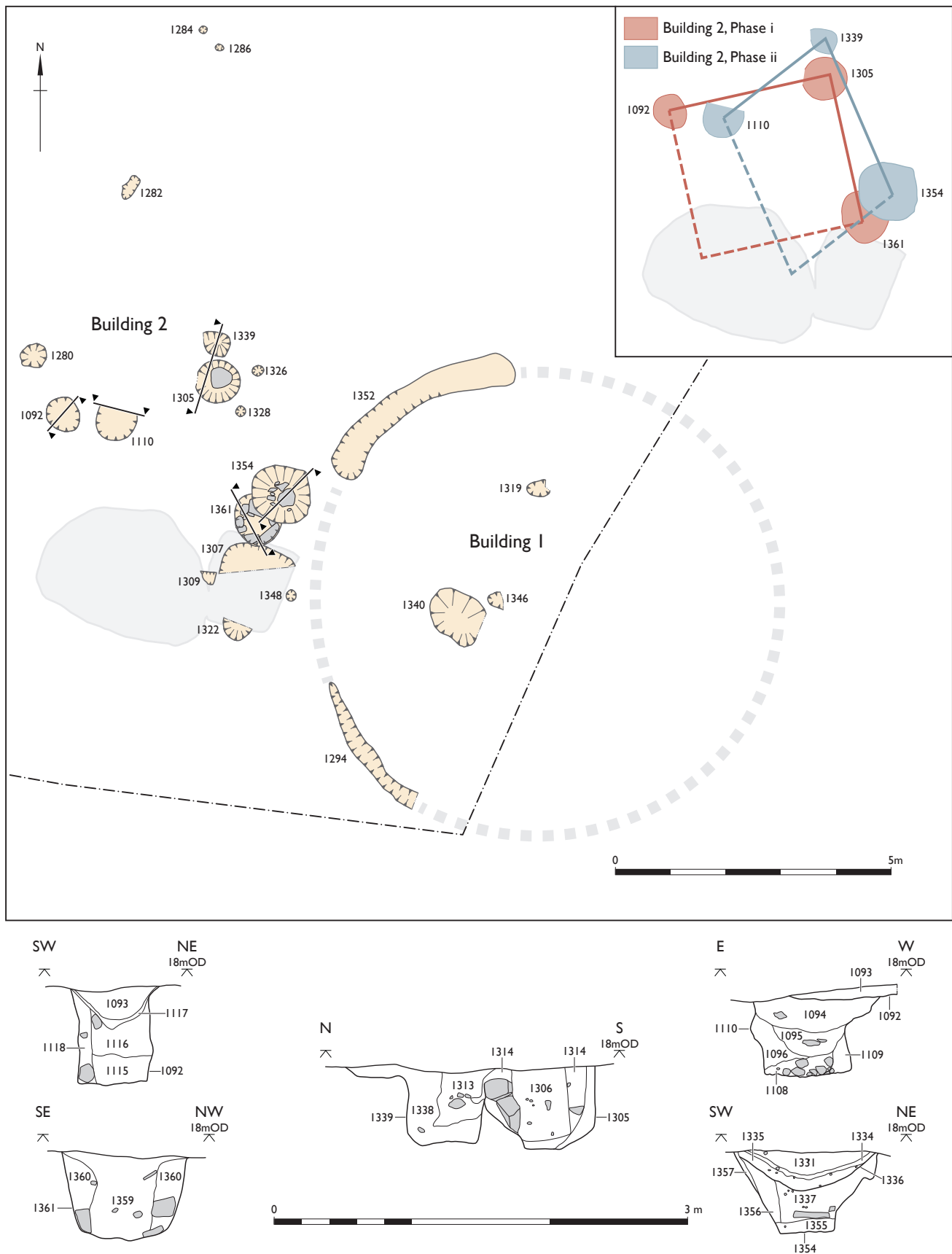


Fig 33 Plans and sections of structural features of Phase 1b. A simplified plan showing the phasing of the four-post structure (Building 2) is inset.

fills (1355, 1357) probably represent natural silting at the base of the cut prior to the insertion of padstones (1358) and clay packing material (1356), which was originally set around a timber post. The post-pipe was possibly defined by the packing material and was filled with a friable grey/brown loam (1337). The dimensions would suggest a circular timber post about 0.4 m in diameter.

Post-hole 4: The partial remains of sub-circular cut (1317) may indicate the location of the fourth corner post to the Phase (ii) four-post structure. The fill (1318) was charcoal rich. Unfortunately, most of the feature was removed by a later medieval cess-pit that was excavated by Hugh Thompson's team in the 1960s.

Phase (iii)

The upper part of post-hole (1354) had apparently been truncated by a later sub-circular cut (1336), which has been interpreted as a hearth/fire-pit, though it is more likely to be an upper fill of the post-hole. The cut (1336) was 1 m in diameter and 0.28 m deep. The primary fill (1335) appeared to be a lining of red clay (no in situ burning was noted

by the excavator). Above this was a very charcoal-rich fill (1334) which gave rise to the interpretation of the feature as a hearth. The upper fill (1331) was a brown silt-sand and was sealed by cultivation soil (1279).

Non-structural stake-holes and post-holes

A pair of stake-holes (1284, fill 1285) and (1286, fill 1287) were identified cutting into the natural sub-soil (1278) in the area between the two later *vomitorium* walls on the arena side of the concentric wall. A further pair had apparently been disturbed by animal burrowing and were treated as one cut (1282) with a single fill (1283). All were sealed by cultivation soil (1201). Two more stake-holes (1326) and (1328) cut the natural subsoil (1278) in the area of the four-post structures. Their respective fills (1327) and (1329) were sealed by cultivation soil (1279).

A single post-hole (1322, fill 1321) to the west of the round-house structure measuring 0.36×0.08 m, was partially removed by a later medieval cess-pit. A stake-hole nearby (1348, fill 1349) was truncated by an ard-mark – part of a group (1275) – confirming that the cultivation episode post-dated the Iron Age structural phase.

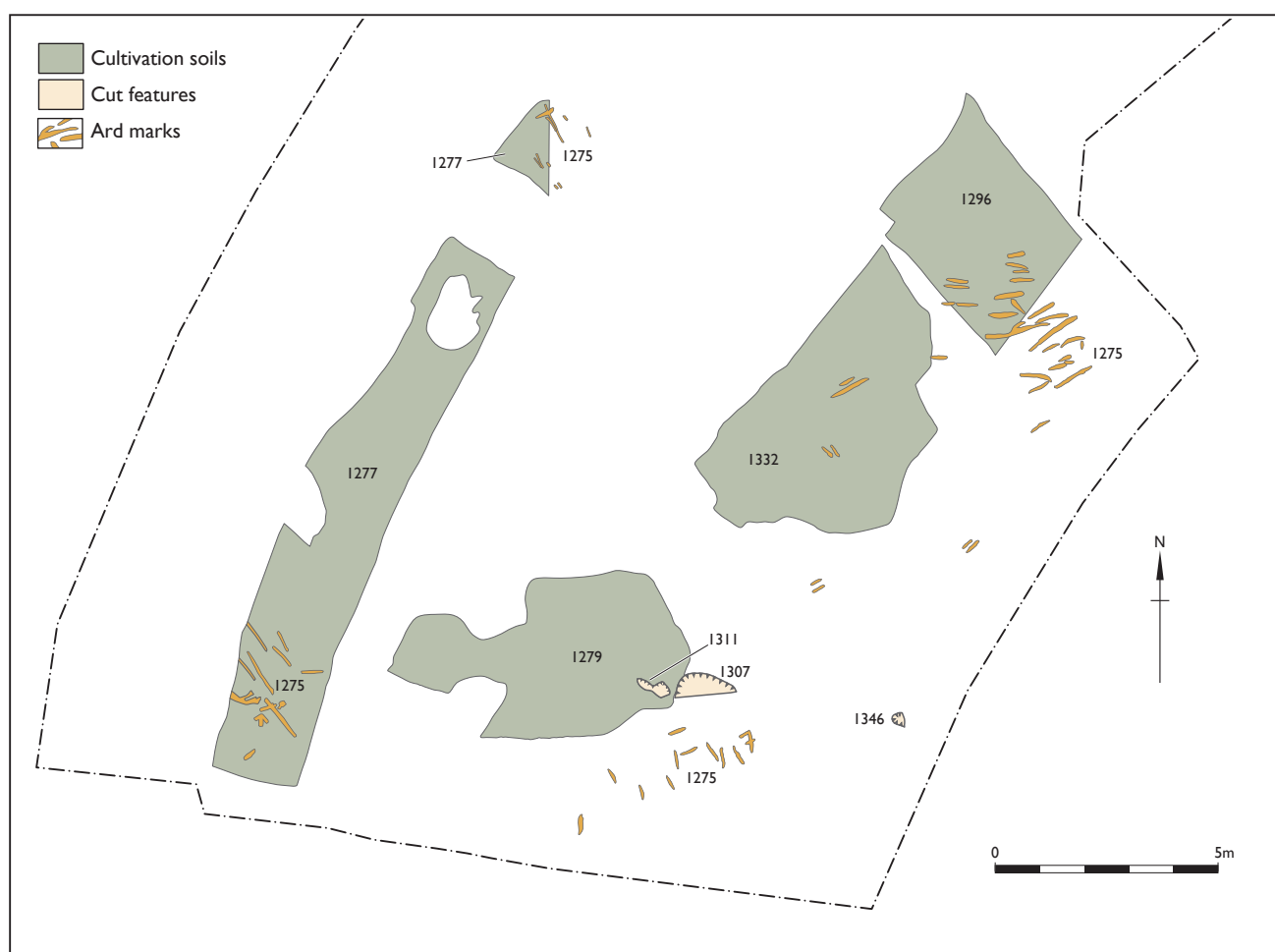


Fig 34 Cultivation soils and ard marks of Phase 1c.

Middle Iron Age cultivation (Phase 1c)

Cultivation soils and ard-marks

During the excavation of the old ground surface, varying excavation conditions led the team to identify slight changes in what had originally been assumed to be a single deposit. What is certain is that they all overlay the earlier Iron Age structural features described above and also sealed a multitude of linear scarring marks in the surface of the natural subsoil. These are thought to have been created by cultivation using an ard. These ard-marks were given a group context number of (1275) for planning purposes. The relationship between one of the ard-marks with a stake-hole (1348) demonstrated that the episode of ploughing with the ard post-dated the Iron Age structural features. The cultivation soils that overlay both these features and the ard-marks were the soils through which the ard had penetrated to scar the surface of the underlying natural (Figs 34, 35).

Cultivation soil (1279) was beneath upper cultivation soil (1201) and sealed the post-holes associated with the four-post structures and round-house gully (1352). Cultivation soil (1332=1296) was located to the north-east of the excavation area. It was again beneath (1201) and was thought to be the same layer as (1279). Between the outer walls of the two later amphitheatres the deposit was represented by (1277).

Miscellaneous features

Several small features were recorded as cutting the lower cultivation soil (1279). In most cases these features were fairly enigmatic and doubt was expressed by the excavator as to the stratigraphic level they were originally cut from. These include pits (1307, fill 1308) and (1311, fill 1312) which had been almost entirely removed by a later medieval cess pit, and post-hole (1346, fill 1347) which was heavily truncated by the cutting of a trench to pour the concrete used to hold the arena wall in place during the consolidation work done to the amphitheatre in the 1960s.



Fig 35 Ard marks (1275) cut into underlying natural deposits.

The later Iron Age (Phase 2)

Upper cultivation soils and cord-rig (Fig 36)

The upper cultivation soil was recorded under five numbers (1201, 1288, 1222, 1123, 1111). The soil was predominantly a compact, grey, silty clay with occasional inclusions of charcoal flecks and small stones, evenly distributed and well sorted. This material (1201, 1222) merged to the south with a more disturbed soil (1288, 1123), which was a more brownish or bluish grey in colour and which contained a small quantity of Roman finds material. The surface of this deposit was remarkably consistent in level, being virtually flat. The surface level at the furthest south side of the site averaged 17.97–18.03 m OD, and this was identical to the undisturbed soil surface level at the northernmost end of the site.

At the northern end of the site the surface of (1201=1222) was scored with parallel undulations, which represented the remains of buried earthworks that pre-dated the construction of the amphitheatre (1302). These features (Figs 36, 37, 54) are a dramatic archaeological discovery, and represent the evidence for arable cultivation immediately prior to the construction of the first amphitheatre, in the last phases of the pre-Roman period. The earthworks survived, though extensively truncated by later structures, over an area approximately 15 × 6 m to the north of the site. They took the form of parallel ridges and furrows on an east-west alignment, of which parts of eleven ridges were recorded. The distance between the centres of the ridges was consistent at 0.64 m where these ridges were undisturbed. A blank area between two areas of ridges may mark a field or plot boundary, though ridges were virtually parallel on either side of this break.

To the south-west another type of earthwork was identified. This comprised a pair of circular depressions (1299) in the surface of (1201) that were 0.8 m in diameter and 0.2 m deep. These features are enigmatic as they have the appearance of being formed within the upper cultivation soil rather than being cut in to it. They also clearly predated the post-hole alignment (1231) and would seem to be broadly contemporary with the ridges (1302).

Archaeobotanical evidence

By Ruth Pelling

Introduction

Given the significance of the Iron Age phases, features were intensively sampled for the recovery of biological remains during the 2004–6 excavations. In total 64 flotation and nine wet sieved samples were processed. Charred plant remains were found to be abundant in a number of samples, most notably from the four-post structure Building 2, and provide an exciting insight into the pre-Roman settlement as well as adding to the growing information on the use of such structures (Summers forthcoming; Monckton 2000; Pelling 2000; Hall and Kenward 2005; Fryer 2007).

Regionally, the charred material recovered from the





Fig 37 Earthworks of cord-rig cultivation viewed in section.

Iron Age settlement at Chester is highly significant, representing the largest prehistoric assemblage for the county of Cheshire (Hall and Huntley 2007). Previously, the largest study in terms of the quantity of material processed was from Beeston Castle, between Chester and Nantwich, from which only a modest assemblage of grain and chaff indicative of scatters of day-to-day cereal processing debris was recovered from Bronze Age and Iron Age features, despite intensive sampling (Hall and Huntley, 2007; Jones and Moss 1993). Very low concentrations of glume wheat grain and chaff were also recovered from clayey sediments at Brook House Farm, Bruen Stapleford, near Chester, dated stratigraphically to the late Bronze Age to late Iron Age (Carruthers 2002). Neither assemblage is indicative of arable cultivation or bulk processing on any scale, although this may be a product of preservation. Analysis of the material from beneath the amphitheatre was conducted by the author in 2014 and provides the first substantial study of the pre-Roman arable economy in Chester.

Sample selection

A total of forty-three samples were assessed from prehistoric contexts (Phases 1b–2), of which seeds and chaff were present in thirty. Samples were selected for full analysis on the basis of an assessment of all samples (Pelling 2013): samples were analysed if they contained good numbers of charred remains (>100) or if they contained fewer than 100 items but added useful information about a particular structure or group of features. A total of 16 samples have been analysed in full: 13 from the four-post-structure (Building 2), two from the round-house (Building 1), both in Phase 1b, and a single sample from the cord-rig cultivation soil of Phase 2.

Methodology

Samples selected for full sorting and identification were first split into manageable fractions using a stack of sieves. One large sample (from post-hole fill (1331) (p 46)) was sorted in its entirety to 1 mm, while the <1 mm flot was split using a riffle box and 25% sorted. Actual counts are presented in

the results tables (Appendix 1), as well as the combined adjusted total figure (the <25% counts were multiplied by 4 and added to the 1 mm counts). Each fraction was sorted under a dissecting microscope at magnifications of up to $\times 50$. Identifiable and quantifiable remains were extracted. Other items of interest such as fly pupae were noted. Identification of plant remains was made on the basis of gross morphology and by comparison with the Historic England modern reference material held at Fort Cumberland. All calculations and graphs were generated in Excel with totals of grain, chaff, weeds and other items given in the tables. Nomenclature and taxonomic order follows Stace (1997) and Zohary and Hopf (2000). A number of items were submitted for AMS radiocarbon dating (p 58).

Quantification and identification

Two hulled wheat species were identified in the samples: *Triticum spelta* (spelt wheat) and *Triticum dicoccum* (emmer). Identification of wheat is most reliable on chaff elements, the distortion caused by charring to grain (Boardman and Jones 1990; Braadbaart and van Bergen 2005; Braadbaart 2008; Märkle and Rösch 2008), and the range of morphological variation likely present within ancient land races, often being too great to allow positive identification. Wheat grain was only identified to species if it conformed to morphologically ‘typical’ forms. Spelt wheat grain has a blunt apex, shallow embryo, low dorsal ridge, parallel sides and a flattened ventral surface, as well as longitudinal impressions resulting from charring within tightly adhering glumes. Emmer wheat grain displays a steeper embryo, dorsal hump and concave ventral surface.

For the purpose of ratios of grain to glume bases the assumption was made that all wheat grains were derived from hulled wheat and that no free-threshing wheat grains were present in the Iron Age samples. The total glume bases include spikelet forks, where one spikelet fork consists of two glume bases.

Identification of the *Brassica* seeds followed Berggren (1962 and 1981) as compiled and circulated by the late Camilla Dickson (Dickson 2011; see also Pearson and Robinson 1994, 574). The spherical seeds distinguish them from the other Brassicaceae, with the exception of *Sinapis alba* (white mustard), which is notably larger with a very fine cell structure. *Brassica nigra* (black mustard) produces more cells which are notably squarer, with strikingly high cell walls compared to the other Brassica species.

Results

The results are presented in tabular form in Appendix 1. Samples not analysed either contained few plant remains, or were duplicates (two samples from the same context). Assessment results are discussed in the text where relevant. The full assessment is available in the project archive.

The most productive samples, each containing in excess of 100 items, were from the features associated with the four-post structure, and the cord-rig plough soil.

Two samples from the round-house (Building 1) produced smaller assemblages, although they were included in the analysis as a comparison. Samples taken from 'non-structural' stake and post-holes, a layer and pits, including pre-round-house features, produced no, or only scant, remains with occasional charred seeds, chaff or charcoal flecks noted. Such material is likely to be derived from scattered material present across the site, much of which can be considerably reworked over time (Pelling *et al* 2015) and was therefore not included in the analysis.

Cereal chaff and/or weed seeds form by far the largest component of both individual samples and the assemblage as a whole. Cereal grains were present in all samples, although in small numbers with only three samples producing more than ten grains. Chaff was particularly prevalent in the four-post structure.

Phase 1b: Middle Iron Age settlement

Round-house (Building 1)

Six samples were assessed from Building 1, five of which were taken from the ring-ditch and one from a pit (1340). Two samples were fully analysed, the only samples noted to contain cereal remains during the assessment. The remaining samples were either devoid of charred macrofossils or contained occasional (fewer than 5) weeds, small grass type rhizomes, and charcoal only. The two sorted samples were from pit 1340 (fill 1341) and gully 1352 (fill 1353).

Both sorted samples produced very few cereal grains: two grains each of *Triticum* sp (indeterminate wheat species, one of which was a more rounded type but with spelt-like characteristics), one grain of hulled barley (*Hordeum vulgare*) in the pit sample and one indeterminate grain from the gully fill. Both samples contained small quantities of glume bases. Only one glume base could be identified as spelt wheat (*Triticum spelta*). Weeds were more numerous than cereal remains in both samples, which included more grasses and grassland taxa, such as buttercup (*Ranunculus* species), sheep's sorrel (*Rumex acetosella*), vetches (*Vicia/Lathyrus* sp) and small leguminous taxa, plantain (*Plantago lanceolata/media*) and sedges (*Carex* spp), than arable weeds. Such material may be the remains of cereal processing waste mixed with grassland and ruderal species growing around the settlement, collected to use as flooring/bedding or animal feed, or even derived from roofing material. The density of material is consistent with scattered burnt debris rather than a concentrated burning event or processing activities.

Four-post structure (Building 2) Phase i

Samples were taken from each of the three large post-holes (post-holes 1092, 1305 and 1361) of the first phase of the four-post structure (Appendix 1).

Post-hole 1: (1092, fills 1093, 1115 and 1117). Three samples were taken, of which two were analysed (1093 and 1115).

These produced very few cereal remains, but abundant weed seeds as well as the largest assemblage of *Brassica* seeds from the site, potentially derived from a harvested crop. A sloe stone (*Prunus sinosa*) may represent a casually discarded and burnt fruit or fuel waste. Occasional small diameter rhizomes and basal culm segments are indicative of stems and roots. Small seeded grass seeds, knotweeds (*Persicaria* species), black bindweed (*Fallopia convolvulus*), seeds of the Chenopodiaceae family, hemp nettle (*Galeopsis* sp) and charred fungal spores, were particularly numerous.

Post-hole 2: (1305, fills 1306 and 1314), was also characterised by weed seeds, although not quite as numerous as in post-hole (1092), with moderate quantities of charcoal (mostly oak (*Quercus* sp) with some alder (*Alnus glutinosa*) and hazel (*Corylus avellana*) identified from context (1306)). One sample from fill (1306) was analysed (Fig 38), producing a modest quantity of chaff, including eleven glume bases of spelt wheat and one spikelet fork of emmer (*Triticum dicoccum*), with 168 weed seeds and a small number of *Brassica* seeds. Small grasses (mostly *Poa annua/Phleum* sp type), Polygonaceae and Chenopodiaceae dominated, while occasional nutlets of *Carex* species, tentatively identified as meadow rue (*cf Thalicttrum flavum*) and a buttercup (*Ranunculus acris/repens/bulbosus*) hint at a damp grassland component. All the taxa identified could derive from the edges of arable fields, or overgrown damp grassland. A *Rubus* seed (raspberry, bramble etc), sloe stone (*Prunus spinosa*) and a fragment of hazel nut shell may derive from food waste. A number of other samples from the same feature, which were not analysed, were noted to contain similar numbers of weed seeds and no or very little cereal grain or chaff (Pelling 2013).

Post-hole 3: (1361), produced two identifiable fills (1359 and 1360), samples from each of which were analysed. Both samples produced large numbers of glume bases and spikelet forks of spelt wheat, with a small number of emmer wheat glume bases and a few grains (wheat, barley and indeterminate). The number of hulled wheat glume bases to wheat grain was 771:3 and 374:2. Weed seeds were also abundant (301 and 97), although less numerous than chaff. Both samples are clearly dominated by the processing by-product of hulled wheat. The occasional grains of both hulled wheat and barley (*Hordeum vulgare*), and barley rachis, are likely accidental losses or residual remains from other processing or storage episodes. The weed seeds are dominated by a range of grasses, *Persicaria* species, and other Polygonaceae and seeds of Chenopodiaceae, in common with the samples from the other post-holes. A notable difference between these samples and the other post-hole samples was the significantly greater number of caryopses of *Bromus* sp and indeterminate large seeded grasses. *Bromus* caryopses are large and difficult to separate from cereal grain, so their presence here may be related

to cereal grain contaminants. A small number of grassland species such as Sheep's sorrel (*Rumex acetosella*), the vetches and small seeded leguminous species were also identified. A stone of hawthorn (*Crataegus monogyna*) and elderberry (*Sambucus nigra*) seeds are not derived from the cereal processing by-product, but could have entered the deposit as background scatters of fire waste. Charcoal was particularly abundant in fill (1359), dominated by oak with some alder/hazel (*Alnus/Corylus*) charcoal noted but not identified to genus.

Four-post structure (Building 2) Phase ii

Seven samples were processed from the three post-holes (1317, 1339 and 1354), of which five were analysed (one of three from (1339), four of four from (1354)). The sample from post-hole 2 (1317) produced fewer than five each of grain, chaff fragments and weed seeds (spelt and barley were noted) and was not analysed beyond assessment (Appendix 1). Post-hole (1354) was a re-cut of Phase i post-hole (1361) in the south-eastern corner of the group, while the other two post-holes were slightly offset from those of the previous phase (Fig 38).

Post-hole 1: (1339, fill 1313). One sample was taken, which contained small numbers of chaff and cereal grains with a more substantial number (341) of weed seeds. This sample is similar in composition to those from the post-hole of the preceding phase (1305), although with a greater percentage of weeds (94% as opposed to 77%). The remaining samples from this feature contained fewer cereal items and slightly fewer weed seeds. Spelt wheat was the only cereal confirmed (on the basis of glume bases). The weed seeds in the analysed sample were dominated by large numbers of *Persicaria lapathifolia*, *Chenopodium album*, *Stellaria media* and small seeded grasses. Given such large numbers of seeds were derived from single taxa it is likely that whole seed heads or clusters were present. All three samples contained a large quantity of charcoal, most of which appeared to be oak, with a little alder/hazel type. Charcoal from the analysed sample produced mostly oak (77 of 100 fragments identified), with a small amount of hazel, including roundwood, alder and *Maloideae* (apple/hawthorn/rowan type) charcoal.

Post-hole 3: (1354). The four samples were dominated by glume wheat chaff, as were the samples in the earlier post-hole (1361) through which (1339) was cut. Moderately sized flots (175 to 550 ml) contained fairly substantial quantities of mostly oak, and occasional alder/hazel, charcoal. Very few cereal grains and a moderate number of weed seeds were counted. Spelt wheat glume bases were the most common chaff element while small numbers of emmer wheat glume bases were identified. The weed seeds included a number of *Bromus* caryopses, amongst other grasses, and mostly fairly ruderal species of catholic habitat. While the number of glume bases were not as

high as they were in the phase i post-hole (1361), the assemblages were very similar in terms of weed species and proportion of glume bases to cereal grain and weed seeds. A single tentatively identified seed of possible flax (*cf Linum usitatissimum*) was also identified from context (1355). Charcoal was identified from context (1337) of which oak dominated, while a small number of fragments of alder and possible hazel charcoal were also present.

Four-post-structure (Building 2) Phase iii

Three samples were taken from feature (1336). Three fills were sampled (1335), a lining of red clay, (1334), a charcoal rich middle fill, and (1331), a brown silt-sand upper fill), all of which produced large quantities of chaff and weed seeds, with slightly more grain and substantially more weed seeds than the underlying phase i and ii post-holes. All three flots were a good size, ranging from moderate (150 ml) to substantial (1400 ml), with large amounts of oak charcoal. The charcoal was mostly oak with some alder/hazel (Appendix 1).

All three samples were dominated by cereal processing by-products of spelt wheat, although the proportion of weed seeds to chaff varied, with a much greater percentage of chaff items in the lower of the three samples, and more weed seeds in the middle fill, the top fill producing weeds and chaff items in similar proportions. Small numbers of emmer glumes and occasional barley grains were present. Cereal grains were slightly more numerous in the upper fill (1331) than any other context at the site, but only numbered 45 compared to an adjusted figure of 754 chaff items. The weed seeds included large numbers of grasses (both large cereal sized and small seeded), seeds of *Persicaria* species, and *Chenopodiaceae* (both *Chenopodium album* type and *Atriplex* species). Bindweed, knotgrass, chickweed and corn spurrey (*Spergula arvensis*) were also common. Oak charcoal was abundant in the samples, while alder/hazel charcoal was also present. It is possible that there has been some mixing of material within the features in this south-east corner of the four-poster. Radiocarbon dates on material from each of the three features/phases (post-holes 1361 and 1354 and feature 1336) were statistically indistinguishable (Table 5) and it is likely that there is considerable mixing, or that it derives from a single burning event.

Phase 2: Upper cultivation soils and cord-rig

Samples were taken from upper cultivation soils (1201) and (1288), both forming part of the remarkably well preserved remains of cord-rig cultivation. Two samples were taken from soil (1201), the upper cultivation layer, while one sample was taken from the more disturbed (1288), which contained occasional Roman material. A moderate quantity of charcoal was noted in the sample from context (1288), but no other charred plant remains. One sample from (1201) produced sufficient remains to merit analysis (the other sample produced fewer than five weed seeds and a small quantity of charcoal).

Sample <4805> from cultivation soil (1201) produced a distinctive flot characterised by a large number of weed seeds (542 quantifiable seeds) and numerous small stemmed basal culms or rhizomes. Three indeterminate cereal grains and three glume bases were the only cereal remains present. The weed seeds were dominated by small seeded leguminous species of clover/trefoil type (*Lotus/Trifolium* sp), with notable numbers of sheep's sorrel (*Rumex acetosella*), persicaria/red shank and plantain. Grasses were small seeded *Poa annual/Phleum* sp type with no large seeded grasses other than a single oat grain. Small numbers of vetches (*Vicia/Lathyrus* sp), parsley-piert (*Aphanes arvensis*), nettles (*Urtica dioica*), violet (*Viola* sp), selfheal (*Prunella vulgaris*), possible mallow (*Malva* sp), buttercup and possible willow-herb (*Epilobium* sp) were also identified. Four seeds of corn spurrey (*Spergula arvensis*) represent the only typical arable weed. This assemblage is not typical of an arable weed assemblage but is more indicative of a disturbed grassland habitat or grassy field margin. The large number of burnt rhizome segments (much more numerous than from the four-post structure) suggests the deposit was formed of uprooted, burnt vegetation, possibly including turves (Hall 2003). Turves or pulled vegetation may have been burnt as part of a land clearance exercise, or may derive from burnt material spread on the arable plot as manure.

Discussion

Economic plants

Three cereal crops were identified in the samples: spelt wheat, emmer wheat and hulled six-row barley. Of these, spelt wheat was by far the best represented, with emmer possibly occurring as a weed of the spelt crop. Given the inherent difficulties in identification of wheat grain, of the 69 grains of wheat identified, only two could be identified as *Triticum spelta* with any degree of certainty and one as *Triticum dicoccum*. A further eight grains showed characteristics typical of one or the other species but not sufficiently reliably to be identified with certainty and were consequently recorded as *Triticum cf spelta* or *T. cf dicoccum*. Two *Triticum* grains were more generally rounded, with particularly notably rounded sides, although tending towards a flatter ventral surface than would be expected for free-threshing wheat, and with slight indications of longitudinal impressions caused by glume bases. It is likely that such grain is derived from the hulled wheat crop but had puffed up during charring, possibly because glumes had been partially or wholly removed before the grain came in contact with heat.

Hulled wheat glume bases are typically more reliably identified than grain, although a number were recorded as indeterminate species due to damage caused during or after charring. Spelt wheat chaff was considerably more numerous than emmer chaff (the ratio of spelt wheat glume bases to emmer being 1175:84, including tentative identifications) suggesting that, at least within the particular

harvest or harvests represented by the four-post structure samples, spelt was the principal crop. Emmer may have persisted as a relic within the spelt seed grain and was possibly tolerated.

Barley represents one third of the identifiable cereal grain assemblage (33.01%). A free-threshing cereal which tends to be poorly represented by chaff, barley is likely to be under-represented in the contexts examined which are grain poor and chaff rich. Occasional diagnostic rachis segments (four rachis nodes/internodes) did confirm the presence of the six-row variety. Barley is present on most sites across the region and, as a reliable cereal crop which can perform on relatively poor soil, it is likely to have always played an important role in most cereal economies (Hall and Huntley 2007).

It is difficult to judge the relative importance of the cereals at the settlement as a whole with certainty. The samples producing the greatest quantity of material were all from the four-post structure and therefore likely relate to the storage within, or use of that one storage structure at the time of destruction, rather than a true reflection of cereal use across the site as a whole. However, the presence of a storage structure presumably intended for cereals or cereal derived products, does imply cereal storage on a notable scale.

Spelt tends to be the better represented of the cereals across most of lowland Britain by the later centuries BC, with the exception of parts of northern Britain and the extreme south-west, and it is likely that it was the most significant crop at the site. Emmer wheat, which nationally declined from the middle Bronze Age onwards in relation to spelt, is now known to have persisted within some areas or communities, being either the principal cereal recovered, for example at Hurst Lane Reservoir, Ely, Cambridgeshire (Stevens 2007), or dominant in some features, as at Saxon's Lode Farm, Ripple, Worcestershire (Pearson 2008). The degree to which emmer continued to contribute towards the cereal economy is difficult to measure and is likely to be variable depending on local and regional socio-economic factors.

Locally, Iron Age samples from Beeston Castle produced a small, mixed assemblage of both emmer and spelt, with some free-threshing wheat (often found to be intrusive on prehistoric sites; Pelling *et al* 2015) and oats, the latter thought probably wild (Hall and Huntley 2007, 40–1; Jones and Moss 1993). Very low concentrations of glume wheat grain and rare chaff (as well as intrusive medieval bread wheat) were recovered from clayey sediments of late Bronze Age to late Iron Age date at Brook House Farm, Bruen Stapleford (Carruthers 2002).

Other than cereals, the only other possible cultivated plants are flax or linseed (*Linum usitatissimum*), represented by one very tentatively identified seed, and black mustard (*Brassica nigra*). *Brassica* seeds were found in a number of samples, but were particularly concentrated in two samples from post-hole (1092) which formed the north-east corner

of the first phase of the four-post structure (contexts 1093 and 1115). Both samples produced numerous weed seeds, suggesting either a *Brassica* crop had become mixed with the weed seeds during storage or destruction of the structure, or the *Brassica* crops had persisted as weeds in the field in a subsequent cereal crop and been harvested with it. *Brassica nigra* is most commonly cultivated for its oil rich seeds used in both cuisine and medicinally, as well as soap making (Clapham *et al* 1989, 73). It can also be used as a green manure. It is a particularly useful crop which can tolerate a range of soils including acidic free-draining sands. According to Clapham *et al* (1989) its wild distribution is on cliffs by the sea, especially in south-west England and on stream banks throughout England and Wales and now common as an escapee. Large numbers of *Brassica* seeds have been recovered from Iron Age contexts elsewhere in the country. An estimated 10,000 *Brassica* seeds were recovered from 40 litres of sediment from a pit near Devizes, Wiltshire (Pelling 2002), while large deposits have been identified from an Iron Age pit at Balksbury Camp (de Moulins 1996, table 23) and adhering to the inside of a pot-base from Old Down Farm (Murphy 1977; Green 1981; Campbell and Straker 2003), both in Hampshire. Thousands of seeds of *Brassica nigra* have been recovered from several pit fills at the Iron Age hillfort of Ham Hill, Somerset (Stevens 2006; Sharples *et al* 2012). Such large deposits certainly point to the cultivation of brassicas as a crop during the Iron Age.

Small numbers of wild fruits and nut remains may have been purposefully collected for food, or accidentally burnt with fire wood. *Rubus* species (bramble, raspberry), *Corylus avellana* (hazel nut), *Sambucus nigra* (elder) *Prunus spinosa* (sloe) and *Crataegus* (hawthorn) could all have been abundant locally and represent readily available food. *Ulex* (gorse), seeds identified from pit (1092), would also have been available locally and provided a useful, quickly burning fuel. Gorse was used in traditional bread ovens in the past (Edlin 1949; Lucus 1960; Gale and Cutler 2000).

Agricultural regime and ecological indicators

Large numbers of seeds of wild herbaceous species are present in some of the samples, where they are likely to be present as weeds of the processed crop, removed with the spikelets prior to de-husking, or separated from the grain with the glume bases after de-husking. The assemblage also includes grassy species which probably grew at the margins of fields, as well as catholic ruderal species growing as arable weeds. Some ruderal weeds growing in and around the structures may also have entered fires. Additionally, some taxa may derive from uprooted grassy vegetation collected for fodder, or potentially even from grassy vegetation growing on the roof of the four-post structure. The taxa represented are therefore likely to derive from a range of habitats, presenting difficulties in terms of the interpretation of the ecology of cultivation practices.

The genus represented by the largest number of seeds is that of the *Persicaria* species, of which both *P. maculosa* and *P. lapathifolium* were present (redshank and pale persicaria). *Persicaria* species are tolerant of wetter soils, often occurring as bankside vegetation, and widespread within arable crops on damp, less calcareous soils (Salisbury 1961, 175). They are likely to have been characteristic of the slowly permeable, seasonally wet, slightly acidic loamy soils within the immediate vicinity of the site and may have been persistent within the furrows of the cord-rig plots. Annual species of spring sown crops are particularly numerous (*Chenopodium album*, *Polygonum aviculare*, *Fallopia convolvulus*, *Persicaria lapathifolium* and *P. maculosa*, Häfliger and Brun-Hool 1968, 177; Van der Veen 1992, 215). However, many of the weeds identified are characteristic of the Chenopoditea community (Ellenberg 1979), which is promoted by intensive cultivation (manuring and hoeing regimes) as much as sowing time (Bogaard 2004, 44–5; Jones *et al* 1999), and also includes ruderal species likely to have been growing within the settlement. Weed taxa which are particularly associated with autumn sown crops, or the cultivation of heavier clay soils, are not well represented. *Galium aparine*, which is represented by a small number of seeds is usually linked with autumn sowing, although it has been found to germinate in the spring in trials at Rothamsted when it tends to be less troublesome than among autumn crops. It could also have been growing in and around the structures. The presence of occasional seeds of this species is not therefore sufficient to indicate autumn sowing. Seeds of more free-draining, slightly acidic soils including *Rumex acetosella* (sheep's sorrel), *Raphanus raphanistrum* (wild radish) and *Spergula arvensis* (corn spurrey) are likely to have occurred on pockets of better draining, presumably slightly higher, areas of acid loamy soils. The weed flora is therefore consistent with spring sown crops, but also with intensive spade cultivation as might be expected of the cord-rig system. It is possible that emmer, which is negatively affected by cold temperatures (Van der Veen and Palmer 1997), was advantaged by spring sowing and was able to persist within the spelt crop.

In addition to the arable weeds a number of taxa more typical of grassland environments, particularly *Lotus/Trifolium* types and several of the vetches (*Vicia/Lathyrus* spp) may have colonised arable fields from grass verges. The seeds of *Lotus/Trifolium* were concentrated in a single sample from the cultivated plough soil however, where they may represent pre-cultivation vegetation or a coloniser during a period of fallow, possibly burnt during a clearance episode, or spread on the fields as burnt dung or other waste used as manure (see below). Small numbers of other taxa of grassland and flood plain environments are likely to have been occasionally collected from other sources, or cultivated fields where they edged onto such environments.

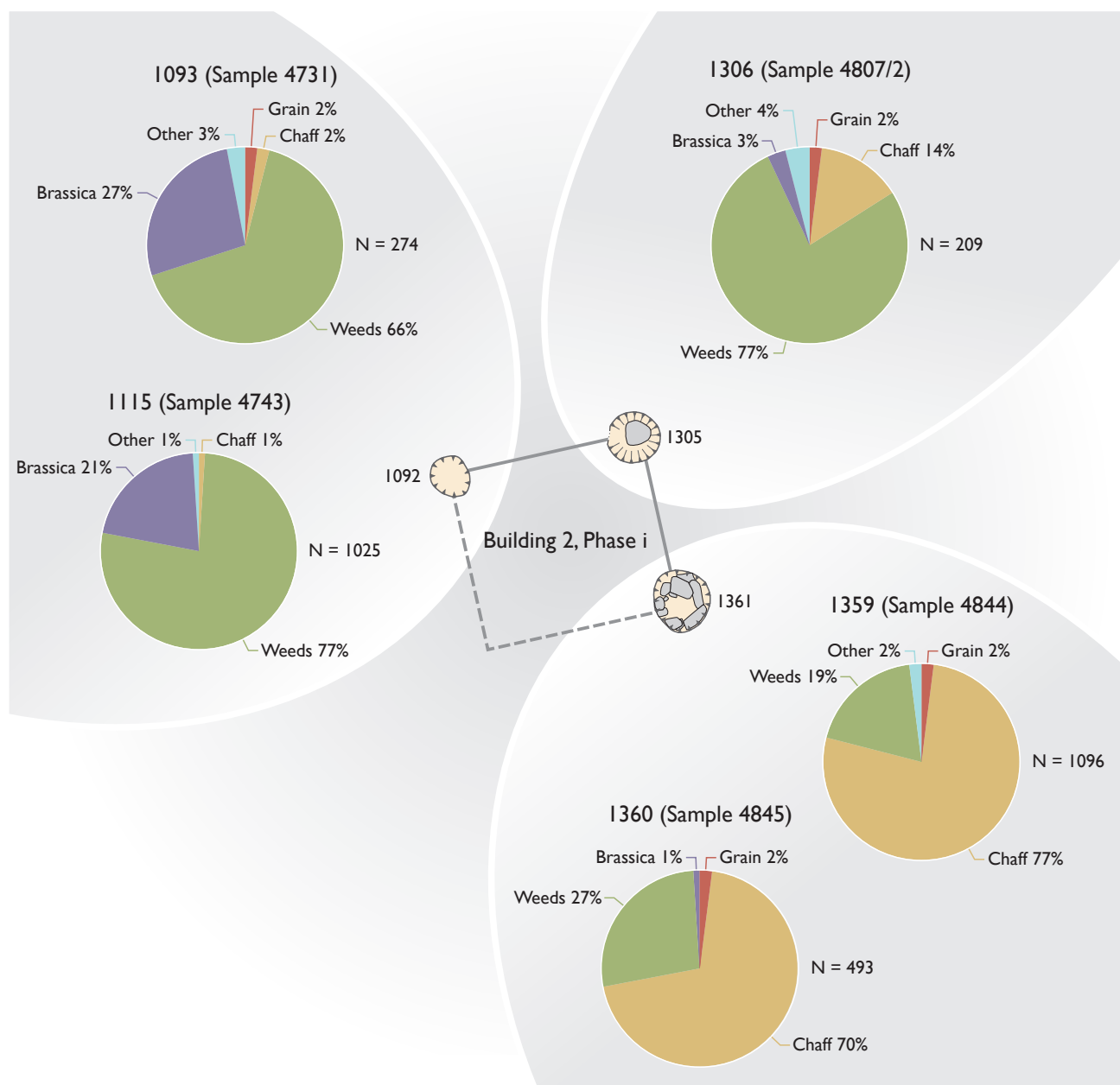


Fig 38 Pie charts showing the distribution of botanical remains within the four-post structure, Building 2. N=total number of quantifiable plant items per sample.

Sample composition

ROUND-HOUSE

The round-house samples produced material characteristic of background scatters of charred cereal processing debris, as well as wild plant species growing within or around the settlement or collected vegetation for animal bedding or feed, or material incorporated in burnt animal dung. The density of items per litre is low (<1 item per litre), while the density of plant remains from the pits and non-structural post- and stake-holes was lower still. In contrast, the density of charred plant remains in the samples from the four-post structure was much higher (ranging from 1.85 to 159.1 items per litre), along with large quantities of charcoal. The

formation of the samples from the four-post structure was clearly different, and must have occurred as the result of a fairly significant burning event, presumably the burning of the structure.

THE FOUR-POST STRUCTURE

Figure 38 shows the sample composition of the five sorted samples from the phase i post-holes in pie chart form. All quantifiable remains are represented. The chaff category includes glume bases and rachis internodes of barley and wheat although it is dominated by spelt and occasional emmer glume bases. The 'other' category includes seeds of trees and shrubs, and other plant parts as given in the tables

(thorns, leaf fragments, rhizomes and so on). *Brassica* seeds are categorized separately (*Brassica nigra* and the less well preserved *Brassica/Sinapis* seeds). N represents the total number of items per sample.

Assuming the deposits recovered from the post-holes of the four-post structure are related to the contents within the structure, as well as the remains of the structure itself, at the time it was destroyed by fire, then they provide some indication of the use and construction of that structure. The large concentration of remains compared to other features would suggest the charred assemblage was the result of a localised burning event. The large quantity of oak charcoal and smaller amount of hazel and alder charcoal would be consistent with the posts and perhaps a wattle construction of a raised storage feature, although the limited evidence for round-wood and the lack of any burnt daub would argue against this. Some of the seeds may have derived from a turf roof or grasses growing within old thatch, or vegetation growing around the structure.

Two types of deposit were distinguished: one characterised by large numbers of glume bases with fairly frequent weed seeds, indicative of a late stage of spelt wheat crop-processing by-product (post-hole 1361), and the other characterised by large numbers of weed seeds (post-holes 1092 and 1305). The mixed weed and chaff assemblage is typical of the 'cleanings' of cereals (the by-product of Hillman's stages 11 to 14; Hillman 1984, 5), which provides a useful animal feed or even human famine food. The weed rich deposits from post-hole (1092) also contained a large number of *Brassica* seeds (forming 27% of the assemblage from context 1093). The *Brassica* seeds may represent a harvested crop; the paucity of *Brassica* seeds in the assemblage from context (1305) would suggest they were not particularly widely distributed as an arable weed. It is possible that the weed seeds in post-hole (1092) derive from a mixture of the assemblages from the other post-holes, particularly (1305), which had mixed with the *Brassica* crop during storage or the collapse of the structure. There is no indication of a hay crop or associated straw remains in these samples (occasional chaff fragments and small culm nodes or rhizomes were present but forming a very minor component compared to seeds, although this could be the result of differential preservation). The range of species in the weed-rich samples was similar to those in the chaff-rich samples, although with greater numbers of particular species (*Fallopia convolvulus*, *Chenopodium album*, *Polygonum aviculare*, and the *Brassica* species) and most notably a greater number of grass seeds. The weed seeds may therefore derive from the removal of weedy vegetation or seeds from harvested cereals, or they may derive from uprooted grassy vegetation, perhaps growing on the edges of arable fields, collected and stored for fodder.

The storage of crop-processing by-products and/or collected grassy vegetation in a raised storage feature is of great interest, and implies an economic value for such by-products. Two stages of processing by-product may be

represented: de-husking (the removal of the glume bases and any weeds remaining with the spikelets), and a separate stage of weed removal (probably prior to storage). In such a two-stage processing system grain would most likely have been stored in spikelet form, with the de-husking occurring immediately prior to use. Such a two-stage approach to processing has been linked to available labour force at harvest time. Stevens (2003) suggests that if labour was short at harvest time, for example on a family based farmstead, there would be pressure to get the harvested cereals into storage as soon as possible, and weeds might therefore be left for removal at a later date once spikelets were de-husked. If labour was available, the removal of weeds prior to storage would be advantageous in terms of reducing the volume of the stored crop.

Well preserved four-post structures which have produced evidence of likely stored contents tend to indicate the storage of grain or spikelets. Processed spikelets of spelt wheat (hulled cereals which had been threshed to break the ears into spikelets, and sieved to remove the bulk of the associated weeds) have been identified from two of a possible twenty-four Iron Age four-post structures at Stanwick, Northamptonshire (Summers forthcoming), from two late Iron Age four-post structures at Drift East, Crick, Northamptonshire (Monckton 2000), one of five Iron Age structures at Lodge Farm, Essex (Fryer 2007), and from Sutton Common, South Yorkshire (Hall and Kenward 2005). Conversely, at Elms Farm, Humberstone, Leicestershire, two post-holes forming part of a mid-late Iron Age four-post structure produced what appears to be fully processed spelt wheat grain, with glumes (hulls) removed (Pelling 2000, 210–11). A contemporary pit from the same site contained processing waste (glume bases) indicating that some cereal processing was taking place on site. One of the structures from Stanwick did however produce a sample which was chaff and weed rich, particularly in the seeds of brome grass, compared to grain, although the numbers involved were relatively small (17 glume wheat grains to 26 glume bases). The sample also contained a number of seeds and seed capsule heads. The deposit was interpreted as the storage of by-products of cereal processing and flax processing waste, probably stored for fodder (Summers forthcoming). The remaining post-holes of the structure produced evidence for storage of cereal grain. Evidence for the exclusive storage of large scale processing by-product and/or fodder in a four-post structure is therefore unusual.

Chaff provided a valuable commodity, useful for animal feed, bedding, fuel, building material (as temper) and for packing. In arid environments particularly, which may lack plentiful wood supplies, chaff and straw have a high economic value and regularly form significant percentages of archaeobotanical assemblages, even for free-threshing cereals, the chaff of which is taphonomically less likely to enter settlement sites and fires (Van der Veen 1999). The use of hulled wheats (emmer and spelt), which require

an extra stage of processing (de-husking) prior to use, inevitably produces large quantities of chaff and weed seeds (Hillman 1981; 1984). All sites on which hulled wheat was consumed would have produced day to day processing by-products, and therefore samples consisting primarily of chaff and weeds are to be expected on all sites (van der Veen and Jones 2005). However, large chaff rich samples, usually regarded as burnt as a convenient fuel (for example as fuel for malting ovens where it is valued as it does not adversely flavour the malted grain), which Van der Veen terms 'intentional local use', can be linked with the expansion of production and bulk processing of crops (1999, 221). Demonstrating intentional use or storage, as opposed to simply discarding onto fires, is difficult unless associated with an identifiable event, such as an episode of use of a corn drier, or the destruction of a storage feature as in this example. An exception is a recent find at a site of 2nd or 3rd century BC date at Burrough Hill Iron Age hillfort, near Melton Mowbray, Leicestershire, where a hoard of bronze horse fittings was excavated, believed to have been a placed offering, possibly within a box, laying on a cushion of burnt (charred) cereal chaff (University of Leicester 2014).

The different composition of the samples from the different post-holes must be the result of distinct storage areas or even storage containers of some sort within the four-post structure. Some mixing had presumably occurred, but the post-hole deposits retain distinct characters indicative of separate deposits (Fig 38).

CORD-RIG

The sample that was analysed from the cord-rig soil horizon (sample <4805>) also produced a significant number of seeds and other quantifiable remains (9.2 items per litre deposit). The weed assemblage was noticeably different to those associated with the four-post structure and includes a grassland habitat component. This particular sample produced very limited cereal remains (three indeterminate cereal grains, one glume base and a spikelet fork), but a large number of weed seeds and small grass type culm nodes, rhizomes and culm fragments. As noted above, the weed seeds were dominated by 292 seeds of *Lotus/Trifolium* type (trefoils/clovers), in contrast to all other samples, in which the total number of seeds was 41 and the biggest concentration in a single sample was eight. Similarly, over half the total number of seeds of *Rumex acetosella* and 78% of *Plantago lanceolata* seeds, both typical weeds of grassland, as well as all the seeds of *Prunella vulgaris* and *Malva* species, were recovered from this one sample. The large number of charred rhizomes and the more restricted range of mostly low-growing species of grassy habitats could derive from the burning, and possibly digging in, of vegetation, similar to 'burnbaking', a post-medieval practice in which the surface of the turf was skimmed off and burnt in piles before being ploughed (or dug) back into the soil in preparation for sowing crops (Kerridge 1967, 25).

Conclusions

The sampling of Iron Age settlement features sealed beneath the amphitheatre have preserved an informative assemblage of archaeobotanical remains. The weed flora in large part reflects the local soil conditions and high water table locally, but is also consistent with spring sowing and possibly intensively manured and spade cultivated field plots. The use of cord-rig field systems is by nature intensive and would enable the crops to be grown on the raised strips above the wetter parts of fields. The weeds associated with wetter ground may have flourished in the lower furrows. Most interesting is perhaps the evidence for storage of cereal processing by-product and weedy vegetation, possibly for animal fodder. The evidence for bulk processing of cereals and the storage of fodder, could indicate agricultural production on a fairly substantial scale. Conversely, the weed assemblage is more consistent with smaller scale, intensive spade cultivation, and it should be noted that the material mostly derives from a single storage structure which may have been associated with a single family group. The nature of the local soils and flooding risk may have placed some limits on arable expansion regardless of the desire to increase production.

Arable production was clearly sufficiently productive to result in an archaeobotanical assemblage of comparable size (and density of items per litre) to better-studied areas in the midlands and southern regions of the country at this time. The evidence is in stark contrast with the scant remains from Beeston Castle and Brook House Farm, Bruen Stapleford (Hall and Huntley 2007; Jones and Moss 1993; Carruthers 2002) for example. It is unlikely that such levels of arable production were happening in isolation, suggesting that the absence of comparable assemblages in the north-west region is likely to be the result of preservation rather than paucity of cultivation; it is the preservation conditions created by the combination of a single catastrophic burning event and the construction of the amphitheatre that are exceptional for the region rather than the arable production itself.

Pollen samples

By David E Robinson and Zoë Hazell

Samples for pollen analysis were taken in order to try and establish the nature of the environment prior to the construction of the first amphitheatre and the scale of Iron Age cultivation. In 2004 a single 500 mm monolith tin <4066> was taken through the old land surface within the area of the amphitheatre from a section exposed in a post-medieval feature (for sample locations see Fig 36). Also in 2004, two 200 mm monoliths <4064>, <4065> were taken from a section exposed in the north wall of a later cess pit, through what was later discovered to be the surviving pre-Roman cord-rig. This area of cord-rig was further sampled in 2006 using two 200 mm monolith tins <4850>, <4851>.

Table 4 Pollen sample results table.

		Density separation	Standard (no microsieving)	Density separation	Density separation	Density separation	Standard (with micro-sieving)	Standard, (with micro-sieving)
Sample Nos		4850	4065	4065	4066	4066	4066	4066
		20–30mm	20–30mm	45–55mm	40–50mm	50–60mm	80–90mm	140–150mm
No. traverses		3	10	8	6	9	11	12
Exotic		402	46	311	482	201	103	83
Corroded/damaged		10	59	17	24	3	58	27
<i>Alnus</i> sp	Alder	-	3	-	-	-	1	3
<i>Corylus avellana</i> type	Hazel pollen type	-	3	-	1	-	1	3
	Mugwort pollen type	-	1	-	-	-	-	-
<i>Artemisia</i> type								
Asteraceae undiff.	Daisy family	1	31	5	22	1	58	80
Caryophyllaceae	Pink family	-	1	2	1	1	2	-
Chenopodiaceae	Goosefoot family	-	-	1	-	-	-	-
Fabaceae	Pea family	-	5	-	-	-	-	-
<i>Plantago lanceolata</i>	Ribwort plantain	-	5	3	2	-	-	-
Poaceae	Grass family	7	11	1	5	1	11	10
<i>Rumex</i> sp	Docks	-	-	-	-	1	-	-
Urticaceae	Nettle family	-	2	1	-	-	2	1
Pteropsida* [Filicales] (monolete) undiff.	Ferns (monolete spore type)	1	-	-	4	-	3	-
<i>Polypodium</i> sp	Polypody	-	-	3	5	1	2	2.5
<i>Pteridium aquilinum</i>	Bracken	-	-	-	1	1	6	-
<i>Gelasinospora</i> sp	Fungal ascospore	-	-	-	1	-	-	-
Sum		19	121	33	66	9	144	126.5

*Pteropsida are now known as Leptosporangiate (true) ferns (Stace, 2010)

Methodology

Samples taken on site were sub-sampled and were prepared for assessment using standard pollen preparation procedures, ie addition of an ‘exotic’ spike (*Lycopodium* spores), treatment with hydrochloric acid, potassium hydroxide, hydrofluoric acid (HF) and acetolysis. The resulting pollen residues were stained with safranin and mounted in silicone oil. Slides were counted until at least 100 fossil pollen grains had been encountered. In the light of the results of assessment seven sub-samples were chosen for further study concentrating on the layers interpreted as buried soils. Pollen preparation methods were based on those outlined in Branch *et al* (2005, 126) (omitting HF and acetolysis stages); using micro-sieving (10 µm mesh) to remove the fine organic and mineral fraction (in addition to a 125 µm sieve to remove any larger material), and density separation techniques (the heavy liquid sodium polytungstate (SPT)) to try and improve pollen retrieval. Exotic marker (*Lycopodium*) tablets were added.

The results, including the preparation techniques used for each sample, are presented in Table 4. Pollen nomenclature follows Bennett *et al* (1994) and Bennett (1994), and where possible the plant names follow Stace (2010).

Results

Four sub-samples from <4066> and two from <4065> were assessed. The pollen assemblages from all six sub-samples were very similar, with Poaceae, *Plantago lanceolata*, Asteraceae, some Caryophyllaceae, *Corylus avellana*-type and *Alnus* sp present, together with spores of *Pteridium aquilinum* and *Polypodium* sp. The general state of pollen preservation and the prominent presence of the more resilient types of Asteraceae, *Alnus*, and Leptosporangiate ferns, however, suggested a certain measure of differential preservation. There was no vertical pollen stratigraphy within the buried soils, but the grains did become less well preserved and more ‘shadowy’ with depth.

In light of these results seven samples were chosen for further study concentrating on the layers interpreted as buried soils. One sample was prepared from sample <4850> at 20–30 mm, from within the cord-rig cultivation soil and two from sample <4065> at 20–30 mm, just above the cord-rig cultivation soil and from 45–55 mm, within the cultivation soil. A further four samples were prepared from sample (4066) at 40–50 mm within iron pan concreting sandy silt above the buried soil, at 50–60 mm and 80–90 mm within the buried soil, and at 140–150 mm, the transition from the underlying natural silty sand. The results, including the preparation techniques used for each sample, are presented in Table 4.

Given the low counts and likely differential preservation of pollen within the samples analysed, they are of limited interpretive value. The absence of tree pollen within the cord-rig cultivation horizons (<4850> and sample <4065> at 45–55 mm) supports the results of the plant macroscopic remains analysis in suggesting that the area under cultivation was quite extensive. The higher pollen counts made from sample (4065) at 20–30 mm with a wider range of species present, most probably relates to this part of the sequence being medieval in origin rather than prehistoric. The results from sample (4066) are similarly inconclusive, although they do suggest a largely open landscape with limited tree cover prior to the amphitheatre construction, with bracken and other ferns also recorded.

Radiocarbon dating

By Peter Marshall, Ruth Pelling, Gill Campbell, Tony Wilmott, Christopher Bronk-Ramsey, Gordon Cook and Paula Reimer

Fourteen radiocarbon measurements were obtained on samples from the site, all but one of which came from contexts associated with the four-post structure, Building 2 (Table 5).

The six samples dated at The Queen's University Belfast were processed using an acid-alkali-acid (UBA-22701–2) or acid only (UBA-22697–22700) pre-treatment as first outlined in Vries and Barendsen (1952). The pre-treated and dried samples were placed in quartz tubes with a strip of silver ribbon to remove nitrates, chlorides, and CuO. The samples were then sealed under vacuum and combusted to CO₂ overnight at 850°C. The CO₂ was converted to graphite on an iron catalyst using the zinc reduction method (Vogel *et al* 1984). The graphite samples were analysed with an 0.5 MeV NEC pelletron compact accelerator, with the 14C/12C ratios corrected for fractionation using the on-line measured 13C/12C ratio and in accordance with Stuiver and Polach (1977).

Five samples were dated at the Scottish Universities Environmental Research Centre. The samples were pre-treated as described by Stenhouse and Baxter (1983), with CO₂ obtained from the pre-treated samples combusted in pre-cleaned sealed quartz tubes (Vandeputte *et al* 1996)

before being converted to graphite (Slota *et al* 1987). The samples were dated by AMS as described by Freeman *et al* (2010).

The five samples submitted to the Oxford Radiocarbon Accelerator Unit (ORAU) were pre-treated following methods outlined in Brock *et al* (2010) and dated by Accelerator Mass Spectrometry (AMS) (Bronk Ramsey *et al* 2004).

All three laboratories maintain continual programmes of quality assurance procedures, in addition to participating in international inter-comparisons (Scott 2003; Scott *et al* 2010). These tests indicate no significant offsets and demonstrate the validity of the precision quoted.

The results (Table 5) are conventional radiocarbon ages (Stuiver and Polach 1977), and are quoted in accordance with the international standard known as the Trondheim convention (Stuiver and Kra 1986).

The calibrations of these results, which relate the radiocarbon measurements directly to the calendrical timescale, are given in Table 5 and in Fig 39. All have been calculated using the datasets published by Reimer *et al* (2009) and the computer program OxCal v4.1 (Bronk Ramsey 1995; 1998; 2001; 2009). The calibrated date ranges cited are quoted in the form recommended by Mook (1986), with the end points rounded outward to 10 years or 5 years if the error is <25 years (BP). The ranges in Table 5 have been calculated according to the maximum intercept method (Stuiver and Reimer 1986); the probability distributions shown in Figs 39 and 40 are derived from the probability method (Stuiver and Reimer 1993).

It is clear from these results that the structural and agricultural activity of Phase 1b can be dated broadly to the period 400–200 Cal BC. The conclusion from the major dating project is completely consistent with a single date on the charcoal fill of a post-hole of phase i of the four-post building (1115) commissioned from the University of Waikato radiocarbon laboratory in 2006 (Wk-19120 : 2207±38BP: 390–340 Cal BC (95% confidence)).

Phases 1b–2: Finds

Briquetage and fired clay material

By Elaine L Morris

A total of 144 fragments of ceramic material (202 g) were examined. Amongst these small fragments, 72 pieces (121 g) are sherds from Cheshire salt-drying and transportation containers that are also known as Stony VCP or Cheshire briquetage (Morris 1985, 352–70, figs 7–10, tables 2–5; 1994, 384–6, fig 4A), while the remaining are fragments of fired clays of undiagnostic purpose. The salt container sherds, comprising one rim and 71 body sherds or flakes of sherds, were recovered from contexts assigned to Phases 1b–2, and residually in Phase 4 with the fired clay occurring also in Phase 1a (Table 6). This is the second location within Chester where sherds of this distinctive material have been found (*cf* Matthews 2001a).

Table 5 Chester Amphitheatre radiocarbon results.

Laboratory number	Sample	Material & context	$\delta^{13}\text{C}$ (‰)	Radiocarbon Age (BP)	Calibrated Date (95% confidence)
<i>Four post structure (Building 2) phase i</i>					
OxA-27917	1306 <4807> sample A	Carbonised grain, <i>Triticum spelta</i> (x4), from fill [1306] of posthole [1305] part of Building 2 (four-post structure) phase i	−24.0	2235±29	400–200 cal BC
UBA-22700	1306 <4807> sample B	Carbonised grain, <i>Hordeum vulgare</i> , from fill [1306] of posthole [1305] part of Building 2 (four-post structure) phase i	−24.6	2185±34	380–160 cal BC
SUERC-45871	1306 <4807> sample C	Charcoal, <i>Corylus</i> from fill [1306] of posthole [1305] part of Building 2 (four-post structure) phase i	−25.7	2272±34	400–200 cal BC
SUERC-45870	1359 <4844> sample A	Carbonised grain, <i>Triticum spelta</i> (x5), from fill [1359] of posthole [1361] part of Building 2 (four-post structure) phase ii	−22.8	2202±34	390–170 cal BC
UBA-22701	1359 <4844> sample B	Charcoal, <i>Corylus</i> from fill [1359] of posthole [1361] part of Building 2 (four-post structure) phase i	−25.8	2320±30	410–370 cal BC
OxA-27916	1359 <4844> sample C	Carbonised glume bases, <i>Triticum spelta</i> (x5) from fill [1359] of posthole [1361] part of Building 2 (four-post structure) phase i	−24.4	2234±30	400–200 cal BC
<i>Four post structure (Building 2) phase ii</i>					
SUERC-45869	1313 <4815> sample A	Carbonised grain, <i>Hordeum vulgare</i> , from fill [1313] of posthole [1339] part of Building 2 (four-post structure) phase ii	−25.0 [*]	2322±34	410–360 cal BC
UBA-22702	1313 <4815> sample B	Charcoal, <i>Corylus</i> from fill [1313] of posthole [1339] part of Building 2 (four-post structure) phase ii	−27.9	2295±42	410–200 cal BC
UBA-22699	1355 <4839> sample A	Carbonised grain, <i>Triticum spelta</i> , from fill [1355] of posthole [1354] part of Building 2 (four-post structure) phase ii	−22.4	2163±34	370–100 cal BC
SUERC-45868	1355 <4839> sample B	Charcoal, <i>Alnus</i> from fill [1355] of posthole [1354] part of Building 2 (four-post structure) phase ii	−26.4	2253±34	400–200 cal BC
OxA-27944	1355 <4839> sample C	Carbonised glume bases, <i>Triticum spelta</i> (x5) from fill [1355] of posthole [1354] part of Building 2 (four-post structure) phase i	−24.5	2216±24	385–200 cal BC
<i>Four post structure (Building 2) phase iii</i>					
UBA-22698	1331 <4831> sample A	Carbonised grain, <i>Triticum spelta</i> , from fill [1331] of 'hearth or fire pit' feature [1336] part of Building 2 (four-post structure) phase ii	−22.8	2170±32	370–110 cal BC
SUERC-45864	1331 <4831> sample B	Charcoal, <i>Corylus</i> from fill [1331] of 'hearth or fire pit' feature [1336] part of Building 2 (four-post structure) phase ii	−24.5	2250±34	400–200 cal BC
OxA-27887	1331 <4831> sample C	Carbonised glume bases, <i>Triticum spelta</i> (x5) from fill [1331] of 'hearth or fire pit' feature [1336] part of Building 2 (four-post structure) phase ii	−25.2	2223±24	390–200 cal BC

* assumed value

Cheshire salt containers

Production and distribution of salt from Cheshire brine springs during the later prehistoric and early Roman periods has been recognised since the 1980s (Morris 1985; Britnell

1989), and recently an extremely useful compilation of the subsequent evidence revealed through careful excavation over the past thirty years has been published (Philpott 2010, 180–3, fig 5.5). Sherds of these distinctive containers

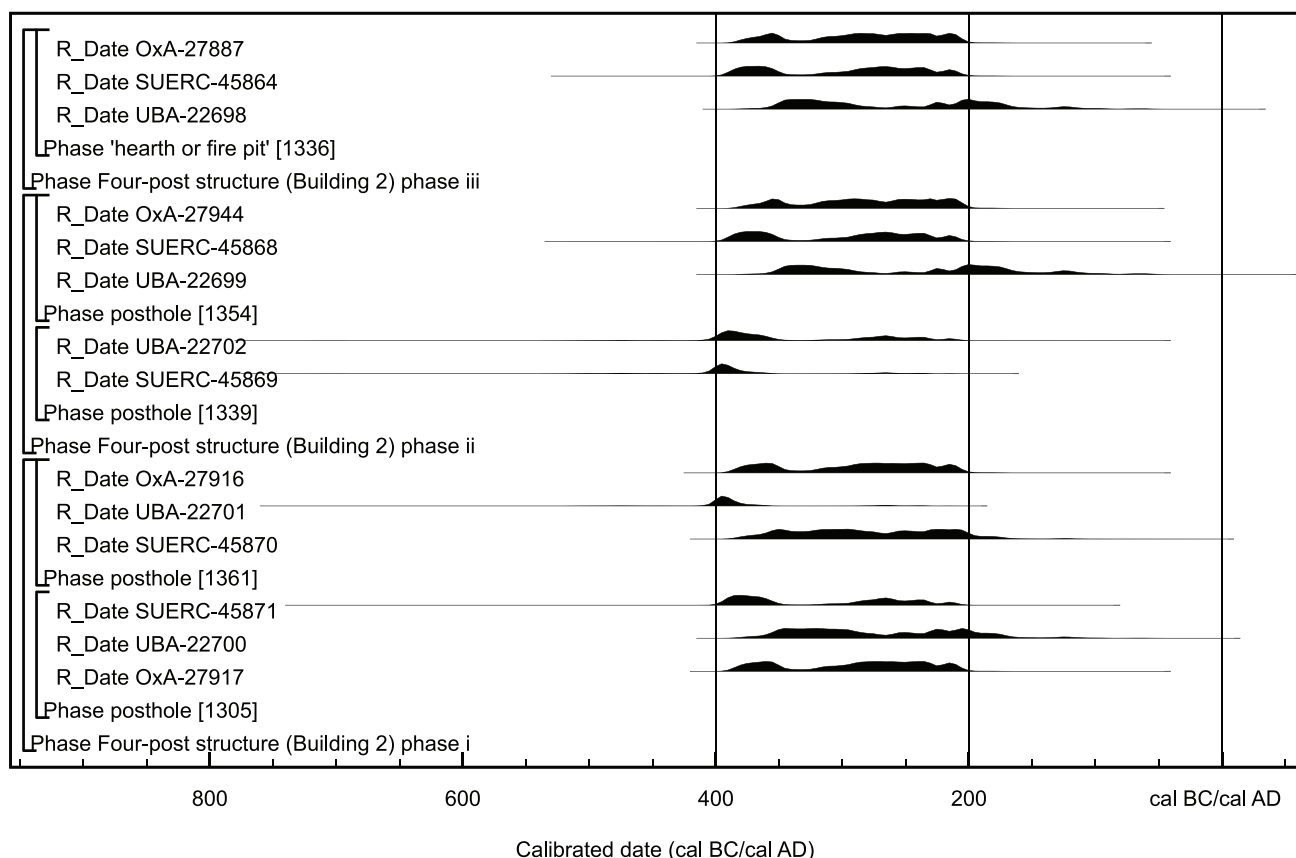


Fig 39 Probability distributions of dates from deposits relating to the four-post structure, Building 2 in Phase 1b. The distributions are the result of simple radiocarbon calibration (Stuiver and Reimer 1993).

have been recovered from many Iron Age sites in the Midlands, Welsh Marches, north Wales and the north-west, including both settlements and hill-forts. In addition, there is an indication that not only was Cheshire salt dried and transported in these containers throughout the Iron Age but these two activities may also have occurred earlier during the Late Bronze Age (Fairburn *et al* 2002).

Chester is located approximately 25–35 km north-west and west respectively from Nantwich and Middlewich where evidence of Roman and Medieval salt production has been recovered, though there is no actual physical evidence of later prehistoric salt production at these locations. The very distinctive fabric of Stony VCP composed of sandy boulder clay and an impressive variety of angular or rounded, large and small, glacial drift erratics, derived from both Lake District and local Cheshire sources however, is indicative of a central Cheshire location of production during the later prehistoric period as well (Morris 1985, 355–66). In addition, the colours of the sherds themselves frequently display evidence that these unusually shaped vases had been associated with salt water when heated. The sherds often have a pink tinge to them and occasionally an off-white to white exterior surface while the rest of the sherd remains light to medium orange from oxidised firing. These two forms of evidence are created through the effect

of chlorine bleaching of the clay when heated. The intensity of the iron colouration fades and is eventually lost as the vase is used for longer periods of time or more frequently through a process of intensification of production (Morris 2007). The presence of salt springs in mid-Cheshire, as a result of the extensive Saliferous Beds underground, would have provided the chlorine. The co-termination of readily-available brine at surface level, specific types of glacial erratics and boulder clay in the same area of mid-Cheshire indicate that this landscape is the most likely origin of these prehistoric pots. Therefore, the recovery of sherds from Cheshire salt packs on sites provides a proxy for the evidence of salt production in this area during the later prehistoric period.

The vessel form of these salt packs is that of a flaring cone with small bases ranging from 100–140 mm in diameter up to much wider rims, 180–230 mm in diameter, and it is frequently possible to identify a concave waistline to this moderately thick-walled profile, as is evident on one of the amphitheatre sherds. The flaring cone shape is wide open for ease of evaporation of the water during the heating of brine, a form that contrasts considerably with that of contemporary closed form, convex-profile domestic pots found on later prehistoric sites in the region. Cheshire salt packs were always handmade, using what appears

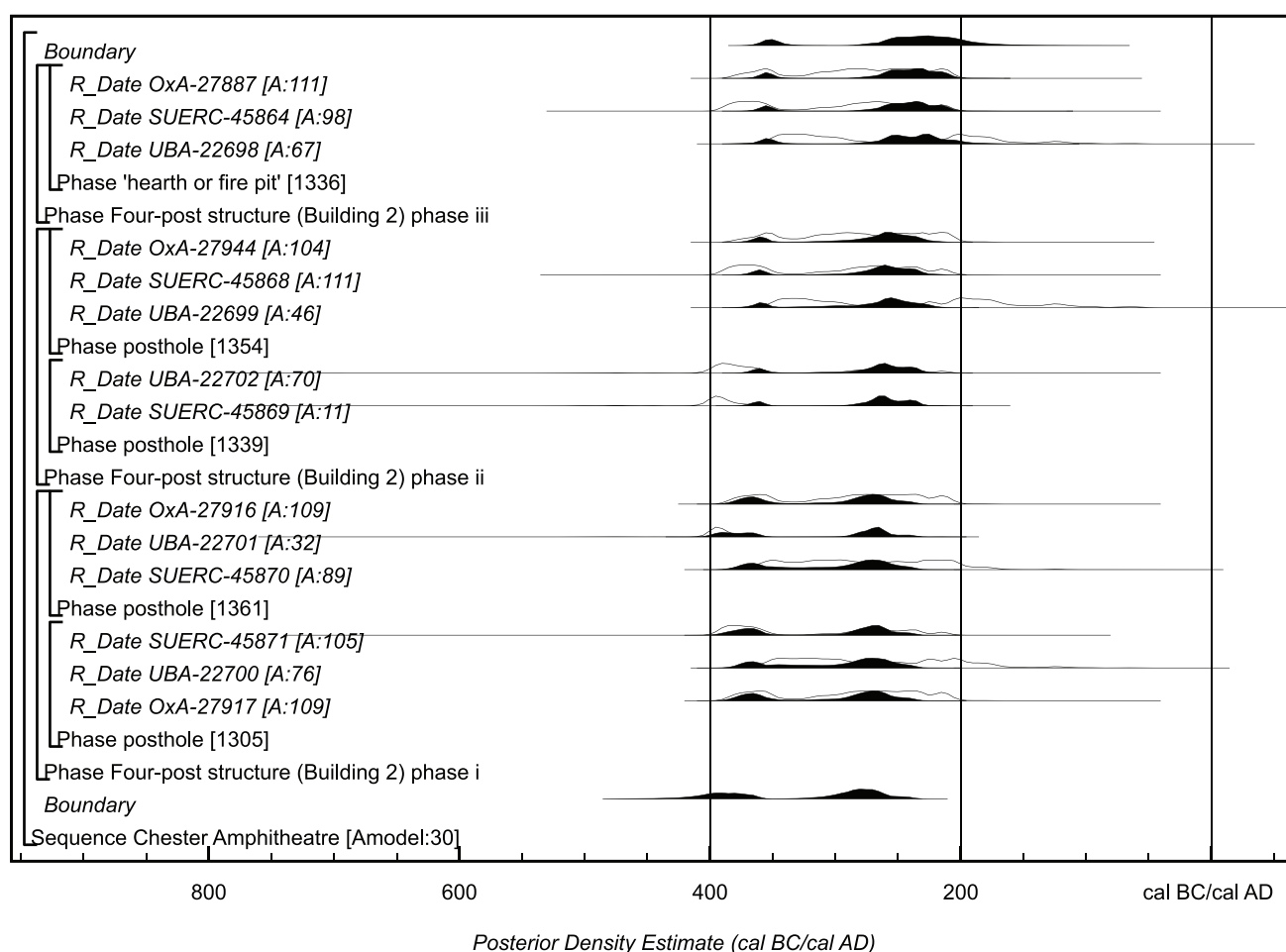


Fig 40 Probability distributions of dates from Chester Amphitheatre (Iron Age activity). Each distribution represents the relative probability that an event occurs at a particular time. For each radiocarbon date, two distributions have been plotted: one in outline which is the result of simple radiocarbon calibration, and a solid one based on the chronological model used. The large square brackets down the left-hand side of the diagram and the OxCal keywords define the overall model exactly.

to be a collar or ring-of-clay construction method based on breakage patterns, as no complete example has been recovered. The rims vary slightly in nature but most often they were finished by folding the clay of the top collar ring over into the interior creating an internal bevel with pie-crust effect. One of the amphitheatre sherds displays this effect and is most unusual in that the potter or saltmaker's fingertip was used to push the fold down quite firmly, revealing their fingernail in the depression (Fig 41). This finishing effect could even be considered as a decoration but is most likely a particular maker's way of completing their work thoroughly. This example is presently unique amongst published examples of Cheshire salt containers, and a detailed forensic examination of these impressions may reveal much about the maker of this particular vessel (*cf* Cotton 2004).

The majority of sherds were found in Phases 1b-c and 2 and these are also the largest sherds by phase based on mean sherd weight (Table 6). The pieces found in Phase 4 (Amphitheatre 1a construction) are likely to have been

the result of redeposition of earlier material rather than evidence of early Roman usage and deposition at the site. The presence of salt containers at the site during the later Iron Age would lend support to any suggestion of a typical settlement at this location, one which belonged to a wide network of trading communities at the time.

Fired clay material

Two quite different clays had been used during the later Iron Age and early Roman phases of activity at this location and become fired or burnt. There is no indication, however, as to what purpose this material had been employed. It is most likely that both clays derive from different sedimentary deposits on or near the location of the amphitheatre, fabric Q1 from boulder clay and fabric Q2 from River Dee alluvium.

Fabric Q1 – coarse sandy clay: Abundant (50%), sub-rounded to rounded, well-sorted quartz, < 0.9 mm across with the majority < 0.5 mm, in a clay matrix with very rare

(<1%), rounded sandstone and/or quartzite, 4.0–15.0 mm across; this fabric can be quite porous in structure, reducing the density of the fabric texture considerably and frequency of the quartz grains to 25%.

Fabric Q2 – dense, silty clay: Sparse (3–5%), subrounded to subangular quartz, 0.1–0.5 mm across, and common (20–25%), finer silt-grade quartz in a slightly micaceous, dense clay matrix.

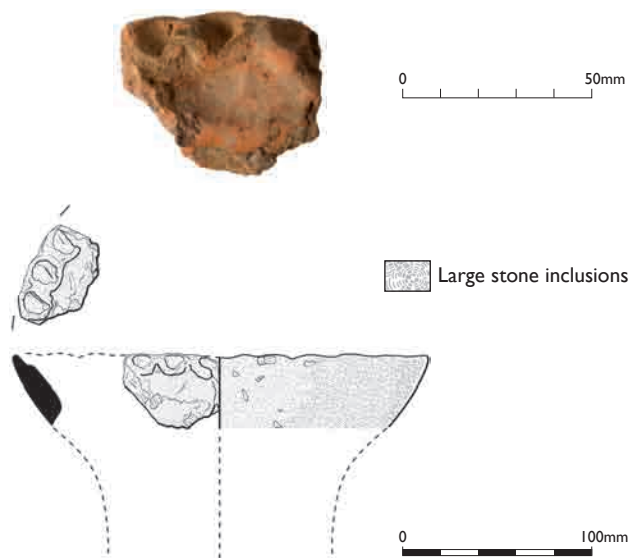


Fig 41 Fragment of Cheshire Salt Container, and reconstruction of vessel form.

Roman pottery

By Gillian Dunn

Ten sherds (18 g) of pottery were recovered from the upper cultivation soils in the area between the later outer and arena walls of Amphitheatre 1 (1201), (1222) and (1288) (p 47). A limited number of fabrics are represented – 1st-century black surfaced ware, reduced and oxidised coarse wares and a fine white ware with a painted circle decoration. There was also one sherd in a calcite-tempered fabric from (1201). All of this suggests an early to mid-1st century date. Alison Heke recorded 12 g of intrusive undiagnostic Roman ceramic building material (CBM) in cultivation soil (1222). All of this material seems to be intrusive from Phase 3 when these deposits formed the working surface.

Iron

By Quita Mould

- 1 Spearhead; iron. Leaf-shaped blade with long pointed tip, mid rib, rounded shoulders and central neck of rectangular section, broken before the socket. Surviving L 113 mm, blade L 102 mm, W 37 mm. A (1296): Phase 1c, lower cultivation soil; SF 9722.01 (Fig 42).

Although the pre-Roman context is secure there appears to be little to distinguish this spearhead from those of Roman date; compare with the dimensions of those found at Hod Hill, Dorset (Manning 1985, 161–6) and the Corbridge Hoard for example (Allason-Jones and Bishop 1988, 104 table 1).

Table 6 Quantification by context and Phase of briquetage and fired clay.

Phase	Context	Briquetage Fabric Stony VCP		Fired Clay Fabrics				Total Count	Total Weight (g)
		Count	Weight (g)	Q1 Count	Q1 Weight (g)	Q2 Count	Q2 Weight (g)		
1a	1291	-	-	1	9	-	-	1	9
1b	1320	1	2	-	-	-	-	1	2
1b	1327	2	6	-	-	-	-	2	6
1b	1353	1	2	-	-	-	-	1	2
1c	1279	27	22	9	12	-	-	36	34
1c	1296	13	20	2	3	-	-	15	23
1c	1312	1	5	1	1	1	6	3	12
2	1201	16	51	14	8	-	-	30	59
2	1222	2	4	4	5	-	-	6	9
3	1288	1	3	-	-	-	-	1	3
4	1270	8	6	10	37	-	-	18	43
TOTAL		72	121	41	75	1	6	114	202

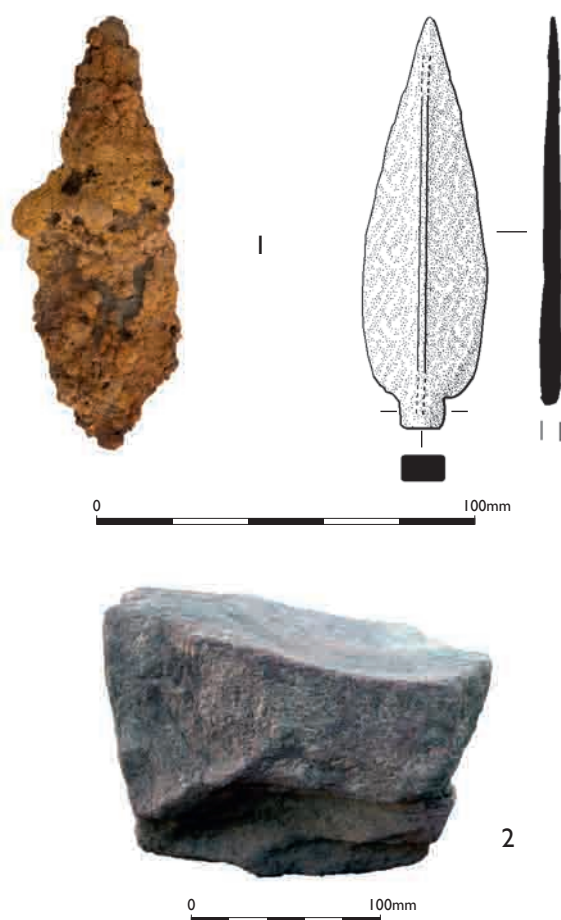


Fig 42 Iron Age artefacts, (1) Iron spearhead (Drawing from X-ray). (2) Saddle quern.

Stone

By Dan Garner

- 2 Saddle quern. A broken fragment measuring 250 mm × 200 mm × 150 mm; representing a roughly shaped block with a dished upper surface created through wear. The quern is of locally sourced red sandstone. A (1314): Phase 1b, primary fill of post-hole (1305) (Fig 42).

The Iron Age context of the saddle quern fragment is secure and is associated with carbon 14 dates calibrated to the Middle Iron Age. Fragments of saddle quern in a local red sandstone have been noted at Eddisbury hillfort (Garner *et al* 2016, 186–7) and a complete example is published from Beeston Castle (Henson and Hurcombe, 1993, 59–60). Saddle quern fragments associated with Bronze Age activity at Oversley Farm included a broken fragment which had been deposited within a post-hole of a four-post structure (Garner 2007a, 94–5). The association of both quern stones and four-post structures with grain processing may suggest that the presence of a saddle quern fragment within post-hole (1305) may represent structural deposition. Possibly a foundation deposit, deliberately broken in order to ritually

Table 7 Summary catalogue of recovered heat-shattered stone by Phase and weight.

Phase	Weight (kg)
1a	2.66
1b	12.15
2	26.28
3	4.32
4	5.55
5	3.67
6	4.35
Total	56

kill the object prior to burial in the hope/expectation that this would bestow good fortune on the four-post structure.

Discussion

Very few finds were recovered from contexts of Phase 1b–c. The lithics (Tables 2, 3) from these phases were residual from disturbed deposits of Phase 1a. This may be true of some of the heat-shattered stone, though this material may have been generated throughout all of the prehistoric phases on the site. Four fragments of Stony VCP briquetage seem to be *in situ* finds (Table 6) as does the iron spearhead. Finds from the cord-rig cultivation soils in Phase 2 included Stony VCP and fired clay, probably derived from the underlying occupation deposits through ploughing. The few Roman sherds were probably intrusive from when these deposits formed the ground surface in Phase 3.

Heat-shattered stone

by Tony Wilmott

A total of 56 kg of heat-shattered stone, principally local sandstone, was recovered (Table 7). The earliest deposit of it was in the fill (1291) of the Phase 1a pit (1290), from which stratified lithics were also derived (above). Although this material is far more abundant than the struck flint and stone, it has a similar stratigraphic distribution, the earliest fragments being stratified in Phase 1a, but being most plentifully represented in the cultivation soils of Phases 1c and 2, with the majority of the material coming from the cultivation soils of Period 2, and then occurring in small quantities in deposits consisting of these soils redeposited either as seating bank deposits or fills of structural features.

Discussion: Iron Age Chester and its wider context

By Dan Garner

The Iron Age archaeology investigated on the amphitheatre site potentially throws up more questions than answers regarding our understanding of Iron Age Chester, and must be seen within the broader context of Cheshire and

the north-west region in general. This needs to be viewed in light of the particular circumstances regarding the development of our understanding of the first millennium BC in the region. The evidence from the amphitheatre is particularly relevant to a number of topics within the wider data set and these are briefly explored below.

Chronology

So few Iron Age sites have been identified and investigated using modern archaeological methods in Cheshire that even in the opening years of the 21st century the focus of any discussion on the period remained the small collection of extant hill-forts and promontory forts concentrated along the mid Cheshire Ridge (Matthews 2001a). These monuments had been the subject of various campaigns of excavation between the mid-1930s and the mid-1960s with excavators primarily focusing on the ramparts and entranceways. Little in the way of artefactual evidence had been recovered from any of the hill-fort sites with the exception of Castle Ditch, (Eddisbury); which was published without any detailed report on the artefacts beyond occasional references to noteworthy finds in the site narrative (Varley 1950). The only site to be investigated using modern methods was the hill-fort unexpectedly discovered beneath the medieval walls of Beeston Castle during excavations in 1968–85 (Ellis 1993).

Indeed, in the first volume of the Victoria County History of Chester in the section addressing ‘Later Prehistory’ David Longley was forced to recognise that:

‘In default of much further evidence for farms and field systems, discussion must rely heavily on the more conspicuous features of the Iron Age landscape, the hill-forts’ [adding] ‘The scarcity of diagnostic artefacts from excavated hill-forts in Cheshire hinders the establishment of a chronological sequence for their occupation’ (Longley 1987, 38).

Beeston Castle produced both dateable artefact types and radiocarbon dates which could be tied to the stratigraphic sequence and structural phasing of the site. The evidence demonstrated that the origins of the hill-fort belonged in the Late Bronze Age (9th to 8th centuries BC) with later phases of rampart construction in the Early Iron Age (5th century BC) (Longley 1987, 38). The Beeston Castle excavations demonstrated that prior to the construction of the medieval castle the prehistoric and later use of the hilltop was complex, with seventeen radiocarbon dates spanning a period of time between the early Neolithic and the early medieval periods (Ellis 1993, 85). The example of Beeston Castle serves to demonstrate two recurring trends for Cheshire sites of the first millennium BC: firstly, they can appear when least expected (they also have a habit of refusing to appear when actively looked for); and secondly, owing to the scarcity of dateable material culture for the period, the application of scientific dating techniques is the only way to refine the site chronology.

The long-term effect has been to leave discussion of Iron Age Cheshire (and the north-west of England more widely) within the archaeological backwater of national discourse on the Iron Age, with some describing the region as a ‘black hole’ (Hodgson and Brennand 2006, 51; Haselgrove *et al* 2001, 25). Whilst other regions have long since identified chronologies of the Early, Middle and Late Iron Age (Cunliffe 2005, 32) the data set for Cheshire is often unable to be even specific to the Iron Age period. Indeed the most famous discovery from ‘Iron Age’ Cheshire, the bog body known as Lindow Man, can only be scientifically dated to somewhere between the Late Iron Age and late Roman period (Housley *et al* 1995). The only recent attempt to set out a chronology for the Iron Age of the north-west acknowledged ‘a chronological framework based, it must be admitted, on only a handful of radiocarbon dates’ (Matthews, 2001a, 1).

Furthermore, since the publication of Matthews’ paper, recent work on the hill-forts of the mid Cheshire Ridge has helped to clarify their chronological position in the narrative of the first millennium BC. All four hill-forts investigated as part of the Habitats and Hillforts Project demonstrated origins in the Late Bronze Age or Early Iron Age, with two (Eddisbury and Helsby) indicating activity spanning the transition in to the Middle and Late Iron Age (Garner *et al* 2016).

As the number of scientifically dated Iron Age sites in Cheshire approaches double figures the national discourse has moved onwards again. Thinking is now moving towards the removal of a distinction between the Middle and Late Iron Age, as it serves to constrain understanding of the wider temporal and geographical context of change (Haselgrove and Moore 2007, 2). It is argued that the Iron Age period should be discussed in terms of the Earlier and Later Iron Age with a point of transition between *c* 400–300 BC, and the Later Iron Age ending with the Roman conquest (Haselgrove and Pope 2007, 8; Haselgrove and Moore 2007, 2). The point of transition during the 4th century BC is marked in many areas of Britain with a break in the settlement evidence, new site types and a move towards occupation of marginal areas (Haselgrove and Pope, 2007, 8). Furthermore, it has been suggested that the core-periphery model for Late Iron Age Britain (Haselgrove, 1982) fails to take into account time depth; with the nature of pre-existing societies being seen of little or no consequence to subsequent social changes (Hill 2007, 17).

The results of the fourteen radiocarbon dates associated with the three phases of the four-post structure (Building 2) at the amphitheatre site are surprisingly consistent, with ten of the dates indicating a date range between 410–160 Cal BC. Amongst the remaining dates there is one from Building 2 (phase i) which gives a range of 410–370 Cal BC and one from Building 2 (phase ii) which gives a date of 410–360 Cal BC. The scientific dating would thus place the main Iron Age structural phase at the amphitheatre site

within the Middle Iron Age in old parlance (as used above) or the transitional stage from the Earlier to Later Iron Age in the proposed new order. This is the only firm dating evidence from the Iron Age phases of the amphitheatre site, as the subsequent phases of cultivation cannot be dated except to say that they occur after the abandonment of Building 2 and before the construction of the Roman amphitheatre. It is, however, most likely that the extant cord-rig earthworks preserved beneath the amphitheatre seating bank belong to the final phase of pre-Roman Iron Age activity on the site, although the possibility cannot be entirely ruled out that these earthworks are associated with activity during the very earliest years of Roman military occupation.

Iron Age buildings

The round-house structure identified at the amphitheatre site had an estimated diameter of 8.4 m. The style of construction would appear to best fit the ‘ring-groove’ type which is occasionally noted in southern Britain but is more commonly associated with settlements in northern England and the Scottish lowlands (Harding 2009, 71). A ring groove was simply a continuous circular trench into which upright posts, stakes or planks could be bedded, and it seems to have been principally used to construct the outer wall of the house. The evidence for possible post-settings from gully (1352) would certainly support this interpretation. The broken nature of the ring-groove slot (with large gaps on the western and northern parts of the arc) does not necessarily imply openings or an entrance and indeed this feature is not uncommon with ring-groove houses; such as Bruen Stapleford Structure 5 (Fairburn *et al* 2003, 18–20). There is a comparable broken ring-groove house plan with a diameter of 10 m from a site in northern France at Poses Sur la Mare (ensemble II) with an entrance

on the east side clearly defined by a pair of large post-holes (Harding 2009, 87–8).

A review of scientifically-dated round-houses of Middle Iron Age date from west Cheshire and Wirral (Table 8) indicates that a variety of construction styles appear to have been in contemporary use with building diameters ranging between 7 m to 13.7 m. The plans of the two Middle Iron Age round-houses identified at Bruen Stapleford both suggest a ring-groove construction with Structure 1 having a diameter of 12.5 m (Fairburn 2002, 23) and Structure 5, phase 2, a diameter of c 8 m (Fairburn 2002, 20). In general, the interiors of these buildings have failed to yield significant numbers of features or artefacts which could allow the refinement of discussion regarding function and use. The possible exception to this is a round-house (Ring Ditch III) currently under investigation at Poulton (Cheshire) which has not only produced an exceptional quantity of artefacts (and the rare preservation of organic remains of bone and antler), but also evidence for manufacture in the form of metal working and antler working (Cootes and Emery 2014; Cootes 2015, 54–5).

The proximity of round-house Building 1 to the south-eastern corner of four-post Building 2 strongly suggests that the two buildings were not contemporary. Unfortunately, the lack of dating evidence for Building 1 (beyond sherds of VCP), or stratigraphic relationships between the two buildings, makes it impossible to infer which building succeeded the other. The four-post structure appeared to have undergone at least one rebuilding, with the first structure being square and measuring 3.5 m by 3.5 m. The three surviving post-holes of Building 2 (Phase i) had intact post-pipes defined by stone packing material which suggested timber posts of 0.4 m diameter. Charcoal-rich fills (1306) and (1359) within the post-pipes of two of the post-holes might indicate that Building 2 (phase i) had

Table 8 Scientifically dated Middle Iron Age round houses from West Cheshire and Wirral (construction style as defined by Harding 2009).

Site name	Construction style	Diameter	Associated artefacts	Material	Sample No	Date BP	Date Cal BC (95%)
<i>Chester Amphitheatre</i>	<i>Ring groove</i>	<i>8.4 m</i>	<i>VCP</i>	-	-	-	-
Bruen Stapleford, Structure 5, phase 2	Ring-groove	c 8 m		Alnus wood charcoal	AA-49269	2240+/-55	400–170
Bruen Stapleford, Structure 1	Ring-groove	12.5 m		Quercus wood charcoal	AA-49277	2195±40	390–160
Irby, Wirral Structure 32	Post-built	c 7.5 m	La Tene II/III brooch	Triticum sp	OxA-8485	2275±40	410–200
Irby, Wirral Structure 32	Post-built	c 7.5 m	La Tene II/III brooch	Hazel nut shell	OxA-8486	2270±40	410–200
Poulton, Ring-ditch III	Ring-ditch	13.7 m	VCP	Hazel nut shell	SUERC-49216	2134±29	351–54
Poulton, Ring-ditch III	Ring-ditch	13. m	VCP	Prunus Wood charcoal	SUERC-49217	2201±29	375–195
Beeston Castle, Building 6	Post-built	c 7 m	VCP	Wood charcoal	HAR-4406	2280±80	402–234

been destroyed by fire. It has been suggested (see Pelling above) that the charred debris from a single burning episode was later worked into contexts associated with Building 2 (phase ii and iii) leading to statistically similar scientific dates from all three phases of the building.

The second four-post structure (Building 2, Phase ii) appears to be more of a rectangular parallelogram in plan and measured *c* 3 m by 4 m; the alignment of this building was slightly different to that of Building 2 (Phase i). The post packing material in the post-holes of Building 2 (phase ii) were generally disturbed which suggested that the timber posts might have been forcibly removed perhaps as part of a deliberate dismantling of the building. However, one post-hole was thought to preserve enough information to suggest a timber with a diameter of 0.4 m.

The favoured interpretation of Building 2 is as a storage building of a type commonly identified on Iron Age sites in Britain; however, this is the first instance of such an Iron Age structure being confidently identified in west Cheshire. There is a strong likelihood that some of the post-holes recorded within the interior of the hill-fort at Beeston Castle do in fact represent four-post structures but no reconstructed plans have yet been proposed for this (Ellis 1993, 35–9). A four-post structure (structure 10) of possible Iron Age date was recorded at Oversley Farm (Cheshire) which measured 3 × 3 m; but the function of this structure was uncertain owing to the general low level of Iron Age activity on the site (Garner 2007a, 104–11). Aside from this, the nearest parallels from the region come from outside the county with one rectangular example recorded at Halewood (Merseyside) measuring 2.5 m by 3.5 m; this was associated with a deposit containing VCP and a radiocarbon date of 830–410 cal BC (Cowell and Philpott 2000, 36–7). Furthermore, two Later Iron Age four-post structures were recorded at Duttons Farm, Lathom (west Lancashire) each of which were approximately 2 m square (Cowell 2005, 68–9). Across the Welsh border, excavations at the hill-fort of Moel y Gaer, Rhosesmor (Flintshire) identified a broad phase of re-construction dated to 345–250 Cal BC that was dominated by a grid of 30 four-post structures (Stanford 1991, 44–6) which are thought to have functioned as granaries (Gale 1991 86–7). The archaeobotanical analysis of the samples recovered from all three phases of Building 2 has revealed interesting results suggestive of the bulk processing of spelt wheat and the storage of different stages of by-product.

Material culture

It has long been acknowledged that Iron Age Cheshire has produced little evidence for non-organic material culture and this has led many discussions to label the area as aceramic; with the exception of some possibly imported pottery (Royle and Woodward 1993, 74). The north-west archaeological research framework resource assessment for the Iron Age notes that ‘... there are few examples of pottery, most appearing to belong either to the very early

Iron Age or to its very end’ and ‘the most characteristic artefact of the period is the so called ‘Very Coarse Pottery’ (VCP), a form of briquetage used in the production of salt from brine.’ (Hodgson and Brennand 2006, 56).

Cheshire salt appears to have been exchanged over a wide region throughout the first millennium BC in VCP containers, which are thought to have been manufactured in the Middlewich-Nantwich area of Cheshire (p 60–61). The dating of VCP is somewhat broad and more recent reviews of radiocarbon dated contexts from the region (Nevell and Roberts 2005, 112; Kinory 2012, 4) indicate a range from the Late Bronze Age (Brook House Farm, Bruen Stapleford) (Fairburn 2002); to the Late Iron Age/Romano-British transition (Great Woolden Hall, Salford) (Nevell 1999). Virtually every discussion of Iron Age sites in the southern part of north-west England has included a section devoted to VCP with an accompanying distribution map; the most recent of which occurred in the monograph on excavations at Irby, Wirral (Philpott and Adams 2010, 182). The material is used as evidence of trade in salt and Morris (1985) identified two phases to the distribution network with a ‘core’ distribution area (*c* 50 km) in the Early Iron Age (before *c* 300 BC) and an extended distribution area (*c* 140 km) in the later Iron Age (Philpott and Adams 2010, 181). Higham interpreted this evidence in terms of the core-periphery model and hypothesised that the distribution of VCP was a one-way exchange from Cheshire to the south as a form of tribute: ‘If so, then Cheshire was by this stage a peripheral part of a tribal community which was itself subordinated to a wealthier and more powerful elite located at a considerable distance to the south’ (Higham 1993, 27–8). This interpretation has been vigorously challenged by Matthews who rejected models based on south-eastern England and the view ‘that the region was populated by an egalitarian farming society. Rather there seems to have been a politico-economic elite who based their wealth on salt and engaged in trade with the continent via an emporium at Meols’ (Matthews 2002, 1).

More recently, Philpott has noted that the distribution of Cheshire VCP now extends eastwards in to Lincolnshire and Leicestershire (the tribal territory of the Corieltavi), and has suggested a correlation between the distribution of VCP and the tribes represented in the small assemblage of Late Iron Age British coins recovered from Cheshire (Philpott 2010, 183). A recent review of the Cheshire Historic Environment Record and the Portable Antiquities Scheme indicates that there are now sixteen Late Iron Age British coins recorded from Cheshire (Table 9); including seven from a dispersed hoard near Malpas which also included twenty-five early Roman coins (the latest of which dated to AD 37). The Cheshire collection includes 8 coins of the Corieltavi and five coins of the Dobunni. Higham has dismissed the Corieltavi coin finds as either losses from later collections or items brought by mercenaries returning home (Higham 1993, 27). However, Philpott argues that in light of the more recent finds of VCP from half a dozen

sites in the east Midlands the exchange appears to be two-way, demonstrating social contacts between communities in Cheshire and the east Midlands (Philpott 2010, 183). The jury is still out, but the association of the seven Malpas coins with twenty-five coins of early Roman date might support Higham's argument for a military rather than economic agent for the occurrence of Late Iron Age coins in Cheshire.

The assemblage of VCP from the amphitheatre site can be compared with other sites in the region (Table 10) to suggest that whilst the quantity is comparable to other settlement sites the mean sherd weight is smaller than usual. The quantities of Stony VCP from Poulton clearly indicate an exception to the norm for an Iron Age site in this region, and the sherd count even exceeds that recorded from the Breiddin hill-fort in Shropshire where nearly 1,000 sherds of Stony VCP were recovered (Musson *et al.*, 1991, 130).

Heat-shattered or fire-cracked stone can also be seen as an indicator of Iron Age material culture in the region

The only feature dated to the Iron Age at Oversley Farm was a large pit filled with heat-shattered stone the basal fill of which produced a single sherd of VCP (Garner 2007a, 104). Whilst heat-shattered stone is not exclusive to the Iron Age period on prehistoric sites in the region it seems likely in the case of the amphitheatre site that much of this material is associated with the Iron Age occupation.

Agriculture

Narrow ridge-and-furrow ranging from 0.7 m to 1.5 m between ridges and dating to the later Iron Age and into the Romano-British period is known as cord-rig (Halliday *et al.* 1981, 55–6; Halliday 1987, 1993, 2001; Topping 1989a, b). It has generally been identified in the southern Scottish uplands and into Northumberland where the lack of later land disturbance, particularly by medieval ploughing (Topping 1989b, 163) or the deposition of peat over ridged landscapes (Halliday 2001, 12) has allowed its survival. Where it exists in the landscape as an earthwork feature it has been detected largely through aerial reconnaissance, primarily by Tim Gates. By 1989, 150 cord-rig sites had been found in Northumberland and southern Scotland, mostly as surviving earthworks, but also on sites where the rig was inferred from a pattern of straight, linear ard-marks (Topping 1989b). Despite the distinctive character of the earthworks they can only be dated where they occur in context with other archaeological features (Halliday 2001, 11). On the Hadrianic frontier a number of Roman installations, have been shown to overlie not just ard-marks (on many sites the most recent account is by Wilmott (2009b, 98–100) but the surviving earthworks of cord-rig. The first of these to be identified was at the fort of Rudchester (Gillam *et al.* 1973). At Greenlee Lough, Northumberland, immediately north of Hadrian's Wall, excavation has shown that a Roman temporary camp overlies a cord-rig landscape. The sequence recorded beneath the fort of South Shields (Hodgson *et al.* 2001) is strikingly similar to that of Chester. A round-house

Table 9 Late Iron Age British coins recovered from Cheshire and Merseyside (c 100 BC – AD 50).

Location of find	Total Number	Tribal origin
Beeston	1	Durotrigan
Brindley	1	Corieltavi
Cholmondeley	1	Durotrigan
Halton	1	Unidentified
Knutsford	1	Dobunni
Malpas	7	Corieltavi (4); Dobunni (3)
Meols	1	Corieltavi
Sandbach	1	Corieltavi
Tiverton	1	Dobunni
Warmingham	1	Corieltavi

Table 10 Quantifications of Stony VCP recovered from sites in Cheshire, Merseyside and Greater Manchester (The material recovered from Beeston Castle is not included as the precise quantities of VCP could not be extracted from the site report).

Site name	Sherd Count	Weight (g)	Mean sherd weight (g)	Rim sherds identified
Chester Amphitheatre	72	121	1.7	1
Bruen Stapleford, Cheshire	83	338	4.1	3
Oversley Farm	1			
Brook House Farm, Halewood	90	269.8	3	2
Chester Business Park, Chester	5	65	13	0
Great Woolden Hall, Salford		c 1,000		
Mellor, Stockport	21	63	3	0
Mill Hill Road, Irby, Wirral	479	2,000.5	4	6 (both rounded and folded versions)
Poulton, Cheshire	1,692	5,738	3.39	90

associated with cord-rig of similar dimensions to that found at Chester, with furrows 0.70 m apart, was burned down between 390–170 Cal BC. Subsequently the site was ploughed with an ard. The Chester find appears to be the first record of cord-rig in Britain south of the main area of survival in Northumberland.

The evidence for burning before cultivation at Chester may relate to the clearance of established grassland or, perhaps more likely given the gradual formation of ridges, the return to cultivation of previously ploughed land that had been left fallow. When cord-rig was first identified beneath Roman structures at Rudchester, Fowler (1983, 175) doubted the interpretation, while suggesting that it might ‘just possibly’ represent the introduction of a new specialised tool. The capability of Iron Age ploughs has been extensively discussed by Crosby (1990, 125–131). She concludes that the previously anomalous Rudchester ridges (and by extension now those at Chester and South Shields) are explicable against evidence from other parts of north-west Europe that sod-turning ards or ploughs did exist. She cites particularly the asymmetric ard head from Mors in Denmark which appears to have been used for this purpose and which dates to 160±100 bc (Laegsmand 1968). The formation of cord-rig has also been attributed to cultivation undertaken by hand-digging with a spade or hoe to create parallel banks of soil between linear ditches, and this seems to be favoured by the archaeobotanical evidence (p 56). The surviving cord-rig at the amphitheatre did appear to be confined to an area of approximately 10 × 10 m and this perhaps indicates a discrete field; the boundaries of which could have been marked by a hedge or light fence which has not survived archaeologically.

The presence of successive forms of cultivation at the amphitheatre site may imply a change in the agricultural regime and/ or, as noted above, technological advance. The use of cord-rig field systems is by nature intensive and would enable the crops to be grown on the raised strips above the wetter parts of fields. It would thus have been better suited to growing crops in a wetter climate. Perhaps it was also influenced by spring or autumn sowing.

Arable farming could not have been maintained without considerable flocks and herds to provide manure for the fields (Hodgson *et al* 2001, 145). Whilst the amphitheatre soil conditions did not favour bone preservation it must be assumed that animal husbandry was being practiced alongside crop production. The on-going excavations at the contemporary site at Poulton have revealed an assemblage of animal bone where mature cattle and pig dominate, with sheep, dog and deer also present (Cootes 2015, 54). The presence of livestock and the need for grazing may provide a context for the heathland and grassland suggested by the pollen analysis at both Frodsham Street and Water Tower Street (see below).

Settlement hierarchy

Contemporary settlement sites can now be located at

Bruen Stapleford and Poulton (Fig 43), the latter having the potential to be a dense agglomerated settlement. In both cases round-house buildings have been radiocarbon dated to the Middle Iron Age/ transition period and are associated with finds of VCP. Both Bruen Stapleford and Poulton are thought to be larger sites than the limits of excavation have so far served to uncover; and probably have both unenclosed and enclosed elements to the settlement layout (Fairburn 2002, 23–5; Cootes 2015, 54). As with the amphitheatre site, both Bruen Stapleford and Poulton are located within major river valleys (the Gowy and the Dee respectively) and are on the glacial clay drift geology as opposed to the light sandy soils of the Cheshire Ridge. In this sense comparisons can be made with contemporary (c 300–200 BC) settlement patterns in eastern England where clusters of open agricultural settlement were not evenly spread but occurred quite densely in the major river valleys (Hill 2007, 21).

Recent work on the hill-forts of the Cheshire Ridge can now demonstrate that Eddisbury hill-fort was under-going a major phase of construction during this period (400–200 Cal BC) with the addition of the outer rampart and bank to its defences (Garner 2012, 53; Garner *et al* 2016, 197–8). Similarly, excavations at Beeston Castle have suggested that the Period 3B rampart and associated entrance were added in the Middle Iron Age (Ellis 1993, 28), while the outer rampart at Maiden Castle (Bickerton) has produced a date of c 380–10 Cal BC (Matthews 2001a, 5). Hence, both unenclosed and enclosed river valley settlements and the adjacent hilltop enclosures can now be placed within a contemporary landscape. Whilst the evidence is still far too sparse to suggest a model for the relationship between these river valley settlements and the hill-forts of west Cheshire, it is a major step forward to be able to discuss them as elements of a contemporary society.

Iron Age Chester

In his book ‘Prehistoric Man in Cheshire’ William Shone concluded that:

‘The Cheshire Plain seems to have been thinly populated by Early Man. Hence Chester ... has ... furnished no evidence of having been a place of any importance before the Romans made it famous’ (Shone 1911, 89–90).

Some 90 years later Matthews, when introducing his socio-economic model for the Iron Age of north-west England, argued that the Iron Age social practices of the region had been effectively masked by the swamping effect of the Roman military and this had caused archaeologists to focus on ‘anomalous’ sites such as Chester (Matthews 2001a, 1). More recently still, Mason’s opening chapter on the advent of Rome briefly reviewed the evidence for Iron Age activity in Chester but concluded:

‘The fact that the fortress [Chester] took the Celtic name of the river it lay beside – Dee = *Deva* (‘the goddess’) – is perhaps itself proof that there was no substantial pre-existing



Fig 43 Map of prehistoric sites in Cheshire and Chester mentioned in the text.

native settlement whose name could be appropriated' (Mason 2012, 30).

Chester as a site has been continuously occupied for at least 2,000 years and during this time any trace of its earlier prehistoric landscape has either been destroyed or buried beneath multiple phases of buildings, roads and fortifications. In this context, the Chester amphitheatre site can be seen to show both sides of the random nature of survival; on the one hand a fragment preserved by burial beneath the north-west quadrant of the seating bank and on the other an area completely removed by the creation of the amphitheatre arena. In some respects it is little short of miraculous that any traces of Iron Age Chester survive in the archaeological record at all. Before considering the evidence from the amphitheatre site specifically, it is worth evaluating the previous archaeological evidence for Iron Age Chester that has been discussed (albeit briefly) in the literature.

Three previous excavations have been noted for producing evidence of pre-Roman cultivation. The first was an excavation on Frodsham Street in 1966 which noted

that the Roman parade ground surface sealed a 'turf layer' *c* 225 mm thick that overlay the clay subsoil. This sub-soil was scarred with the evidence of cross-ploughing which demonstrably pre-dated the foundations of the Roman fortress. Pollen samples were taken from the top and base of the turf layer (as well as one of the underlying plough scars) indicating a phase of complete woodland clearance and cultivation; followed by the re-establishment of natural grassland with mixed deciduous woodland around it (Petch, unpublished). Mason states that this evidence for ploughing dated to the 3rd century BC (Mason 2012, 29). Re-examination of the site archive could find no reference to scientific dating; indeed such methods were not common practice in Chester during the 1960s. Thus an Iron Age date remains speculative and the 3rd century BC date in doubt. On the site of the Library on St John Street, only 80 m north of the amphitheatre, excavations in 1988 recorded 'slight striations discernible in the surface of the natural clay [which] could have been formed by cross-ploughing during the same phase of pre-Roman cultivation attested by evidence from the Frodsham Street site' (Mason 1989, 5).

The third site, at Abbey Green found evidence of striations in the sandstone bedrock indicating pre-Roman cultivation and fragments of residual pottery of Iron Age or earlier date within the second Roman fortress rampart. The report made reference to the Frodsham Street evidence (McPeake *et al*, 1980). Re-examination of the Abbey Green site archive has shown that one sherd amongst the residual prehistoric pottery is of Cheshire stony VCP (Nevell and Roberts 2005, 113). As with the Frodsham Street site, firm dating for the pre-Roman cultivation is not present and an Iron Age date remains speculative.

To these should be added work done during repairs to the northern circuit of the City Walls, to the south of the Northgate on Water Tower Street. Here a section through the original turf rampart of the Roman fortress defences identified redeposited turf and topsoil incorporated into the rampart (no *in situ* pre-Roman buried soil horizon was identified) (Le Quesne 1999, 71–5). Pollen samples were taken from the redeposited turf and topsoil and the results were interpreted on the assumption (without scientific dating) that this represented the pre-Roman Iron Age surface prior to the arrival of the Roman military. The pollen showed signs of a partly wooded, partly open grassland landscape. The pollen associated with woodland and scrub species were characteristic of a river valley wood with evidence of grasslands and some heathland. A single grain of cereal was also recovered. The pollen was thought to represent vegetation within 10–20 m of the turf's original location; this was also thought to be close to the rampart in which it was later incorporated. The favoured interpretation was that the turf incorporated into the Roman rampart had lain close to a boundary between woodland growing along the Dee valley and wood pasture and grassland on the site itself; it was thought that in the surroundings there were neither cornfields producing cereal, nor settlements scattering it during grain processing (Greig 1999, 76).

During the pollen work on the Water Tower Street site, material which had been retained from the Abbey Green rampart excavations in 1975 was also assessed. This indicated broadly similar pollen spectra to Water Tower Street (Greig 1999, 76). However, the pollen analysis does not acknowledge that the presence of grass and heathland species can be interpreted as evidence for a managed landscape. An 'empty' landscape or one which had undergone a phase of 'depopulation' prior to the arrival of the Roman military would have been entirely dominated by woodland species as ungrazed lowland heath can return to regenerated woodland within a generation if unmanaged. The pollen evidence perhaps does more, therefore, to support an argument for the presence of a pre-Roman population in the environs of Chester than was previously suggested.

There is at least one site within the Roman fortress itself that should be considered alongside the evidence of pollen analysis from buried pre-Roman topsoil and the widespread evidence of cultivation described above; namely the

site of the Roman Elliptical Building (above p 3). Here, excavations between 1963–9 identified a number of pre-Elliptical Building features including a length of ditch described as being steep sided, flat-bottomed and aligned roughly east-west, being at least 16.45 m long, 4.25 m wide and 1.25 m deep. No dating evidence was recovered but the uppermost portion of the ditch appeared to have been removed during the construction of the Elliptical Building (Mason 2000a, 8–9). When discussing this evidence it is stated in the report that 'their [the ditch and associated features] character clearly points to a Roman date', and they were interpreted as aspects of a Roman temporary camp. The fact that other elements of such a camp were not identified is accounted for by the 'cursory nature of this part of the fieldwork' (Mason 2000a, 10). There is actually no evidence to demonstrate that the pre-Elliptical Building ditch was of Roman origin although it was certainly a truncated survival from an earlier phase of activity. The fact that it is located on the 'highest part of the sandstone ridge on which Chester stands' is used to support the argument for an early Roman military installation (Mason 2000a, 11) but the argument would be equally valid for the site of a late prehistoric enclosure.

Returning to the evidence from the amphitheatre site it is important to re-state the need to consider the time depth of the Iron Age evidence recovered. The time span could be as much as 400 years between the construction of Buildings 1 and 2 and the creation of the cord-rig (equivalent to the entire Roman occupation of Chester). What is perhaps notable is that the evidence for buildings appears to be confined to the earlier part of the sequence; furthermore, there is no clear evidence for earlier Iron Age activity prior to the construction of the round-house or four-post structure. This provides the interesting dilemma of trying to use the accidental survival of some structural evidence from the 4th/3rd century BC in order to attempt to draw valid conclusions about the entire Iron Age occupation of Chester. Nevertheless, some attempt at forming a model must be made.

The earlier Iron Age of Chester (that is the period between *c* 700–400 BC) remains absent in the archaeological record of the amphitheatre site and no new data can be added to that already available for the wider region. This may to a certain extent be simply part of the more open and frequently less visible nature of the Late Bronze Age/Early Iron Age pattern; although the material culture of the Late Bronze Age in Cheshire is often more visible than that of the subsequent Iron Age.

The appearance of buildings on the amphitheatre site which implies permanent settlement at the start of the transition period to the later Iron Age (*c* 400–300 BC) can possibly be seen as significant evidence for social change. This development has been noted in other areas of Britain during this transition period with the appearance of new type sites and a move towards occupation of marginal or less densely settled areas, such as wetlands (Haselgrove and Pope 2007, 8). This change is argued

to reflect an increasingly bounded landscape with a shift towards enclosure and increased definition of individual households linked to raised tensions over land and/or a growing population. The character of this settlement evidence at Chester would suggest an agricultural based economy with large-scale production and processing of cereal crops, dominated by spelt wheat, to a level where storage of surplus was both possible and necessary. Spelt wheat has been linked to the cultivation of heavier clay soils and has been used as an indication that new, previously uncultivated, land was being brought under cultivation (Cunliffe 2005, 408–9). The evidence from a number of other Chester sites appears to indicate episodes of pre-Roman cultivation spread over a large part of the modern city. The regional model proposed by Matthews saw the Middle Iron Age as a period when localised chiefdoms developed into a more complex state system primarily based on economic control. The main evidence for this is argued to be through indications of long-distance trade and the presence of a multi-cultural coastal emporium at Meols (Wirral) (Matthews 2001a, 34).

Matthews argued that this early development of a complex state system in north-west England remained stable and probably conservative for centuries, so that the Late Iron Age was more a period of consolidation or even retrenchment. The replacement of the settlement with cultivation soils covering the entire amphitheatre site does not indicate abandonment; as arable farming involving cultivation clearly continued in the area. This is more likely to indicate settlement drift although a shift to a more nucleated and possibly enclosed settlement pattern is also possible. The formation of the cord-rig earthworks can be seen as the final manifestation of evidence for cultivation and arable farming on the site prior to the construction of the amphitheatre in the later 1st century AD.

In summary, we must return to Mason who states that:

‘The second-century geographer Ptolemy actually refers to *Deva* as a ‘*polis*’ of the Cornovii, although why he should call it a town and assign it to the *civitas Cornoviorum* when he must have known the site was a legionary fortress standing on military land is unclear. Possibly he was referring to the *canabae* beside the fortress or, more likely, the civil settlement at Heronbridge 1 mile (1.6 km) away’ (Mason, 2012, 27).

The tribal territory of the Cornovii is thought to have included both Shropshire and Cheshire, although the absence of coins and a relative lack of finds make the definition of the tribal identity difficult in terms of material culture (Cunliffe 2005, 210). Matthews has argued that the evidence from Ptolemy dates to the late 2nd century AD and therefore refers to Romano-British rather than Iron Age administrative arrangements; he even questions the existence of a people known as the Cornovii during the Iron Age (Matthews 2001a, 35). Whatever the reality of the situation was, the reference to *Deva* as a town of the native population, when it was primarily a Roman

military installation, is an intriguing one. It perhaps hints at a pre-existing settlement at Chester that was displaced by the arrival of the Roman military and the construction of the legionary fortress. The evidence recovered from the amphitheatre excavations has clearly served to demonstrate Iron Age settlement at Chester hundreds of years before the Roman fortress was built. How significant this settlement was immediately before the arrival of the Roman military remains a matter for future research.

ROMAN OCCUPATION BEFORE THE AMPHITHEATRE (PERIOD 2: Phase 3)

Cultivation soils

The earliest occurrence of Roman material culture in the stratigraphic sequence was in the slightly disturbed version of the Phase 2 cultivation soils (1201), identified to the south-west of the site and designated (1288). This layer seems to have equated to another soil deposit (1123) comprising well-sorted brownish-grey sand silt, and Roman pottery from the same vessel was recovered from both contexts.

Miscellaneous features

A number of features which could not readily be interpreted were cut into the Phase 2 cultivation soils (Fig 36). Two stake-holes (1292, 1315) and a post-hole (1297) were cut into the top of the cord-rig earthwork (1302). A gully (1175) measuring $2.53 \times 0.63 \times 0.17$ m and filled with sandy silt was truncated by later structures, so its extent and function could not be ascertained. Along its western edge was a line of four stake-holes (group context number 1269) with which it may have been functionally associated. A substantial oval shaped post-hole (1218) measuring $0.95 \times 0.9 \times 0.6$ m was also cut into the cord-rig earthwork. The primary fill (1236) was probably silting prior to the insertion of a timber post, and the secondary fill (1219) contained a substantial stone that may have served as post-packing. If so, the stone’s central position within the cut might suggest that this was a double post-hole. An area of slippage on the eastern side of the cut may indicate where a post was levered out after use. Two more stake-holes (1303, 1324) were similarly cut into the surface of cultivation soil (1201).

Post-hole alignment (1231)

In the area between the later amphitheatre walls to the south-west, a series of small post-holes formed a clear NE to SW alignment that respected neither the cord-rig nor the line of the amphitheatre walls. There were six post-holes in the alignment recorded as cuts (1139), (1223), (1225), (1227), (1229) and (1271). They were all filled with similar red-brown sand. It seems likely that post-hole (1297) was part of the same structure. No artefactual evidence was recovered from these post-holes and their dating remains debateable. It is likely that they form one side of either an



Fig 44 Area of footprints and tracks imprinted into wet ground and sealed by the amphitheatre seating bank.

ephemeral timber structure or part of a fence-line, possibly for a small stock enclosure.

Footprints and tracks (1240)

To the south-west of post-hole alignment (1231) there was a slight depression in the surface of cultivation soil (1222). This may have once formed a muddy hollow that had clearly been churned up by the passage of traffic. This was mainly indicated by the presence of a mixture of human footprints, wheel-ruts and animal tracks that overlay one another (Figs 36, 44). The sequence appeared to suggest that the earliest imprints were human footprints (1240) in a mixture of shoe sizes from possible children/small female feet to average sized male footprints. On two examples there was a suggestion that these pedestrians had been wearing footwear and in one instance it was possible to suggest that the imprint of hobnails was visible. The human footprints were overlain by a series of three narrow wheel-ruts (1250, 1276) that were probably formed by a small cart. Finally, there was a series of animal tracks (1251) (some of which were possibly hoof prints from cattle) that may have post-dated both the human footprints and the wheel-ruts.

Pre-amphitheatre Roman occupation deposits

The footprints and tracks, together with a further trampled layer (1189), within which individual prints were not distinguished, were sealed beneath a thick layer of fairly sterile red sandstone brash (1183=1274). This levelling deposit seems to have been the earliest in a series of layers and features of Roman date in the south-western part of the site that predated the construction of the amphitheatre. Though they were identified outside the later wall of the first amphitheatre, and were thought at first to be associated with the construction of the building, this does not seem to be the case as these deposits were eventually cut by the construction trench for the first amphitheatre.

The sandstone brash layer (1183=1274) was *c* 0.16 m thick and was cut by a shallow sub-circular shaped pit (1205) 0.68 m in diameter (Fig 45). The fill (1206) was

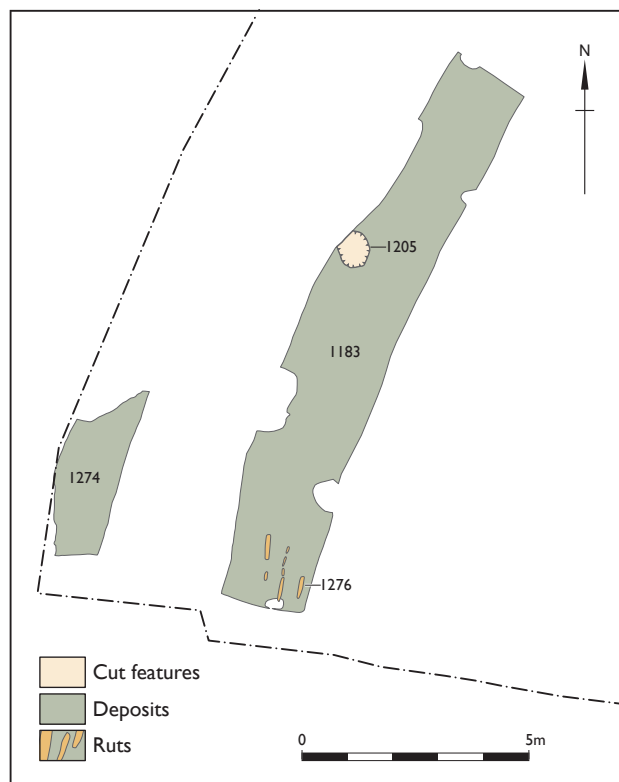


Fig 45 Deposits and cut features of Phase 3 to the south-east of Area A (1).

characterised by the presence of charcoal. A second irregular shaped feature (1179) was subsequently cut into fill (1206); and was itself filled by silt (1180) which produced small amounts of animal bone and Roman glass. In the south-western corner of the excavation a number of wheel-ruts (1276) were identified cut into the surface of the sandstone (1183). This succession of small features serves to suggest that the surface of the brash deposit remained exposed for a period of time prior to a thin layer of metallurgy (1160) being laid.

Surface (1160) was cut by a stake-hole (1174), which had apparently been driven into the surface at a 45 degree angle. After this stake had been removed a layer of 'trample' (1126=1255), containing Roman domestic material formed (1160) (Fig 46).

Layer (1126) was cut by a small stake-hole (1128), and a sub-rectangular pit or post-hole (1142), which had been deliberately backfilled with an angular red sandstone (1143). A third feature (1144) was a patch of clay *c* 1.3 m in diameter that had been partly removed during later construction, and was interpreted as an oven base.

These features were sealed successively by a thin layer of mottled grey clay (1273), and a layer of fine orange sand (1107), the surface of which was at 18.18 m OD. The sand was cut by a shallow linear beam-slot (cut 1103, fill 1102) 1.7 m long (Fig 47). It is not clear what this might have functioned with. This was overlain by a consistent



Fig 46 Deposits and cut features of Phase 3 in Area A (2).

layer of compact grey-brown clay, which may have been an occupation layer, as it contained a quantity of finds material, animal bone and charcoal (1091). Above this was a widespread deposit of red sand (1086), which contained a coin of Vespasian dated to AD 71 (CO 21), among other finds. An irregular shaped patch of black compact sandy silt measuring 1.6×0.7 m (1082) above this was the latest feature to pre-date the construction of the first amphitheatre.

It is important to note that similar deposits were not found to the north and east of Area A, and that no truncation had occurred in that area. This means that this pre-amphitheatre Roman occupation did not extend so far.

Finds and dating

By Gillian Dunn, Margaret Ward, Alison Heke, David Shotter and Tony Wilmott

Cultivation soils

A small assemblage of 86 sherds weighing 300 g came from the disturbed upper cultivation soil (1123=1288) (p 284), as well as three fragments of CBM. This material was the ground surface during the earliest Roman occupation, and the few sherds found within the cultivation soils are clearly intrusive as a result of this. The assemblage comprised mainly local oxidised and reduced wares, of indeterminate vessel form. Imported wares were represented by a Central Gaulish Pompeian red ware vessel dated to the mid-late 1st

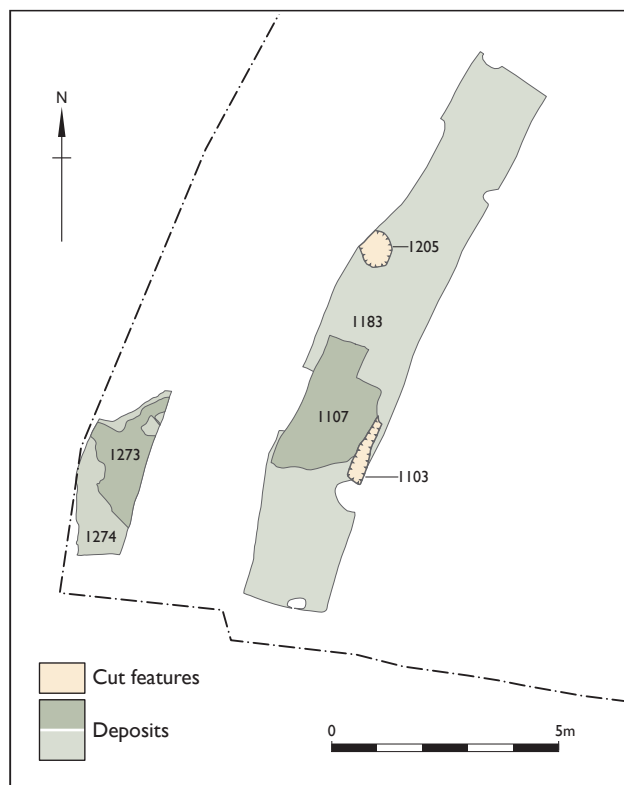


Fig 47 Deposits and cut features of Phase 3 to the south-east of Area A (3).

century (Pot Cat no 1, Fig 270). The context also produced a samian stamp of a potter who was active in the range AD 65–90 and the dish itself appears to be a late-Neronian or early-Flavian product (Sam Cat no 2), and a Camulodunum 189 amphora dated to the mid-late 1st century. Also from (1288) was a single coin (CO 22, p 216) of the reign of Vespasian, dating to AD 71.

Pre-amphitheatre occupation deposits

The earliest feature dateable to the Roman period by finds evidence was one of the post-holes in the early alignment (1272). This contained a fragment of a copper-alloy convex disc with an incised line around the edge, and a dome-headed copper-alloy stud. The sandstone brash layer which sealed these features (1274), produced nine sherds of coarse grey and orange wares and a base fragment of a mortarium. Two sherds of pottery came from the orange sand covering the wheel ruts (1107) and the beam-slot fill (1102). Layers of trample from this phase (1126, 1255) produced scraps of lead, four fragments of blue-green vessel glass including the base of a probable mid-1st to late-2nd century prismatic bottle, and 49 pottery sherds (154 g) the majority being local orange, grey and white-slipped orange vessels (eg Pot Cat

no 4, Fig 272). Of six samian ware scraps in (1126) one was dated *c* AD 70–110, but it weighed <1 g and may well have been Flavian. Two joining pieces of lead offcut came from the oven base (1144). All of these deposits contained small, undiagnostic pieces of CBM.

The occupation layer overlaying this, (1091), produced six sherds of local oxidised and reduced wares, four fragments of vessel glass including a colourless bowl with a vertical moulded rib, and sixteen fragments (184 g) of CBM.

The widespread deposit of red sand (1086) which was one of the two latest deposits of this phase produced six sherds (89 g) of local oxidised and reduced wares. It also contained evidence for activity in the shape of several pieces of waste lead, tacks and unidentifiable fragments of sheet copper alloy, 57 fragments (292 g) of CBM including a fragment of *tegula*, and six fragments (13 g) of Roman plaster, decorated with red paint fading to pink as well as six fragments of daub. Above this, the final deposit before the construction of Amphitheatre 1 (1082) produced iron slag, charcoal, waste lead including (Func Cat no 249), and forty one fragments (139 g) of daub at least two of which had surface traces of white limewash. It also contained 20 sherds (102 g) of primarily local black-on-brown, oxidised and reduced fabrics including a ?local 2nd-century mortarium.

Importantly the sand deposit (1086), like cultivation soil (1288), contained a single coin (CO 21, p 216) of the reign of Vespasian dating to AD 71.

Discussion

It is not possible to make conclusions on the nature of Roman activity before the amphitheatre, apart from the fact that this was limited to the western end of Area A. The few cut features, the activity reflected by the footprints and tracks and by a range of finds, pottery, glass, metals, building materials, lime-washed daub and painted plaster, all suggest that structural activity and domestic occupation was not far away, and that this was generating rubbish prior to the construction of the amphitheatre. It is interesting to note that painted wall plaster was already a waste product in Chester, demonstrating its very early use in the settlement. Although the date range of the local pottery is broad, the more closely dateable material from this phase is consistently later first century. The imported wares from this phase date from the mid to late 1st century (p 285), 12 samian ware vessels represented by mere fragments have a narrow range of production dates from possibly the late Neronian to the Flavian period with one stamp dated within the range AD 65–90 (pp 246–7). The two Vespasianic coins, both dating to AD 71 are consistent with the other evidence. It is very unlikely that the coins were significantly residual, and these finds provide the *terminus post quem* for the construction of Amphitheatre 1a.

PART 3

THE ROMAN AMPHITHEATRES

3.1 THE FIRST ROMAN AMPHITHEATRE (PERIOD 3)

Period 3 incorporates Phases 4 to 7, covering the lifetime of the first Roman amphitheatre. The first form of this building, constructed in Phase 4 is designated Amphitheatre 1a. It was radically altered without demolition in Phase 6 to become Amphitheatre 1b. Phases 5 and 7 reflect the use of the building and activity both within and outside its walls between the phases of construction:

Phase 4 Construction of Amphitheatre 1a
Phase 5 Use of Amphitheatre 1a
Phase 6 Construction of Amphitheatre 1b
Phase 7 Use of Amphitheatre 1b

The state of knowledge prior to the 2004–6 excavation was based upon the work of Thompson (1976) and of Keith Matthews (2001b; 2002; 2003), both of whose conclusions are summarised above (pp 14–21). Thompson postulated the existence of two amphitheatres; the first, wholly timber built, was represented by the so-called ‘grillage’, while the second included all of the excavated stone elements and was wholly of stone. Matthews’ later work on the northern half of the amphitheatre, particularly in his Trench XII (below), led him (2003) to modify Thompson’s conclusions. He associated the ‘grillage’ with the ‘concentric wall’, interpreting the timbers as supports for the seating in a single stone-built amphitheatre. The present project has shown that Matthews was correct in associating the ‘grillage’ with the ‘concentric wall’, but wrong in assuming that there was a single amphitheatre on the site. We can now demonstrate that there were two successive amphitheatres, different from each other in their architecture and pretension, but both having stone outer walls.

The most important change to the earlier conclusions was the discovery in 2004–6 that the so-called ‘concentric’ stone wall of Thompson’s stone amphitheatre (Thompson 1976, 159–60), which lay between the outer wall and the arena wall, was in reality the outer wall of the first amphitheatre. Other elements revealed in Thompson’s excavation can now be understood in terms of this building. The base-plates of the timber seating framework within the *cavea*, the so-called ‘grillage’, which formed the basis of the interpretation of Thompson’s timber amphitheatre (1976, 134–44), are now understood to have been inserted during the major renovation of Phase 6. The timber-framework was clearly built to respect both the outer wall of Amphitheatre 1 and the line of the existing arena wall, and for this reason the arena wall, or a predecessor on the same line, must be assumed as an original feature of Amphitheatre 1a that was retained in use through all subsequent alterations, even during the major rebuild that created Amphitheatre 2.

Thompson excavated the arena wall and the major northern and eastern entrances leading into the arena. It was impossible in 2004–6 to explore these important structural features in context with the *cavea*, as the stratigraphic relationships had been destroyed by the insertion of concrete retaining walls during the work to consolidate the monument in the 1970s (p 16). For this reason it is not possible to be certain of the form or location of the original entrances. However, Matthews (2003) was able to conduct excavations in the east entrance (Entrance 3). He established that Thompson had excavated only to the primary level of the entrance to Amphitheatre 2. Below this surface, Matthews discovered features which pre-dated the existing walls. At the time of the excavation he interpreted these features as belonging to a pre-amphitheatre phase



Fig 48 Plan of the surviving elements of Amphitheatre 1a in Area A, showing the outer wall, robbed north entrance wall and the primary seating bank deposits.

of extra-mural building. Analysis of the site records in the light of the 2004–6 findings, however, now clearly show that he had found the outer wall of Amphitheatre 1a, which was continuous across the site of the east entrance of Amphitheatre 2, and therefore that Amphitheatre 1a did not have a major east entrance into the arena.

In this chapter the evidence for the first amphitheatre will be described by phase. Although this amphitheatre has two structural phases, the evidence for Amphitheatre 1 will be discussed and interpreted as a whole in order to avoid repetition (pp 147–61).

AMPHITHEATRE 1a CONSTRUCTION (Phase 4)

The key stratigraphic sequence that allows the construction of Amphitheatre 1a to be understood was examined in Area A. This will be discussed first. Other relevant observations will then be described.

Area A (Fig 48)

The outer wall

The outer wall of the amphitheatre was the first element of the structure to have been constructed. The clean deposits of the primary seating bank were deposited against the inner face of the wall, and these deposits clearly comprised material thrown up from the excavation of the arena.

The wall (180=200=172) was set in a foundation trench (1084). This was most clear along the outer face of the building where it cut the upper layers of the Period 2 sequences (1086, 1082). It appeared as a narrow slot 200 mm wide along the edge of the wall and was filled with a packing of brown friable mortar mixed with sandy silt (1085). At the north-east corner of the site the construction trench was in part cut through a very localised pile of

redeposited natural red-brown clay-silt (1083), capped with broken sandstone (1104). This was levelled up by the deposition of a layer of redeposited material, probably derived from the extant pre-Roman plough soils (1080). On the inner face of the wall, the foundation trench was defined at the surface level of the disturbed cultivation soils of Phases 2–3 (Fig 134).

The foundations of the wall were 2.3 m broad, but a mere 0.29 m deep (level of base of foundation, 18.23 m OD) and comprised roughly laid blocks of undressed sandstone levelled off to the contemporary ground level with small sandstone pieces. The foundation was poorly bonded with brown clay, leaving a large number of voids (Fig 49). The superstructure of the wall was of the same breadth as the foundations, but survived unevenly. In some areas 2–3 courses of the outer face were present, but the best survival was on the outer face of the wall to the north of the excavated area, where 3–4 courses survived over a distance of 6.3 m (Fig 50) and to the far south of the area where a small section survived to four courses (Fig 51). The facing comprised red sandstone blocks measuring up to 550 mm long and 160 mm high. Many of the stones were poorly squared, with faces tapered by as much as 50 mm from one end to another (P Hill, pers comm), resulting in uneven coursing. In some places vertical running-joints occur across courses. At the southern end of the best-preserved section the bottom two courses were offset by 60 mm, but this reduced to no offset at the northern end. The facing masonry was thus of variable quality. It is of the kind defined by Hill (1981, 2–4) as ‘coursed rubble’, and is of typical legionary standard. The core of the wall was of small sandstone rubble set in brown clay. No evidence of mortar bonding was found *in situ*, but the cement mix fragments found within the robber trenches give some indication as to the bonding material used. Within the robber trenches of the outer wall the predominant mortar was a pale grey-brown sandy mortar (Heke 2016, Type 5; Table 81, Phases 10–11b; p 369).

The relatively poor quality of the construction of the wall was commented upon by Thompson (1976, 160), who erroneously attributed it to the fact that the wall was intended to be completely buried in the seating bank.

Radial wall

To the north-east of Area A was a linear foundation trench (1124=1098) which ran between the outer wall and the arena. The southern end of the feature was cut away by the later *Nemeseum*, which was probably inserted during the alterations to the structure in Phase 6 (pp 125–28). The area around the foundation was extraordinarily heavily disturbed by later activity, principally by two large pits, one possibly late Roman or early medieval in date (222), and one post-medieval (194), and then by Thompson’s excavation (005). Despite this, the sequence around the foundation was established through examination of the section of the edge of Thompson’s trench (Fig 52), and



Fig 49 Shallow sandstone foundations of the outer wall of Amphitheatre 1a in Area A.



Fig 50 The most extensive surviving area of the outer face of the outer wall of Amphitheatre 1a (180).



Fig 51 Fragment of the outer face of the outer wall of Amphitheatre 1a to the south of Area A (200).

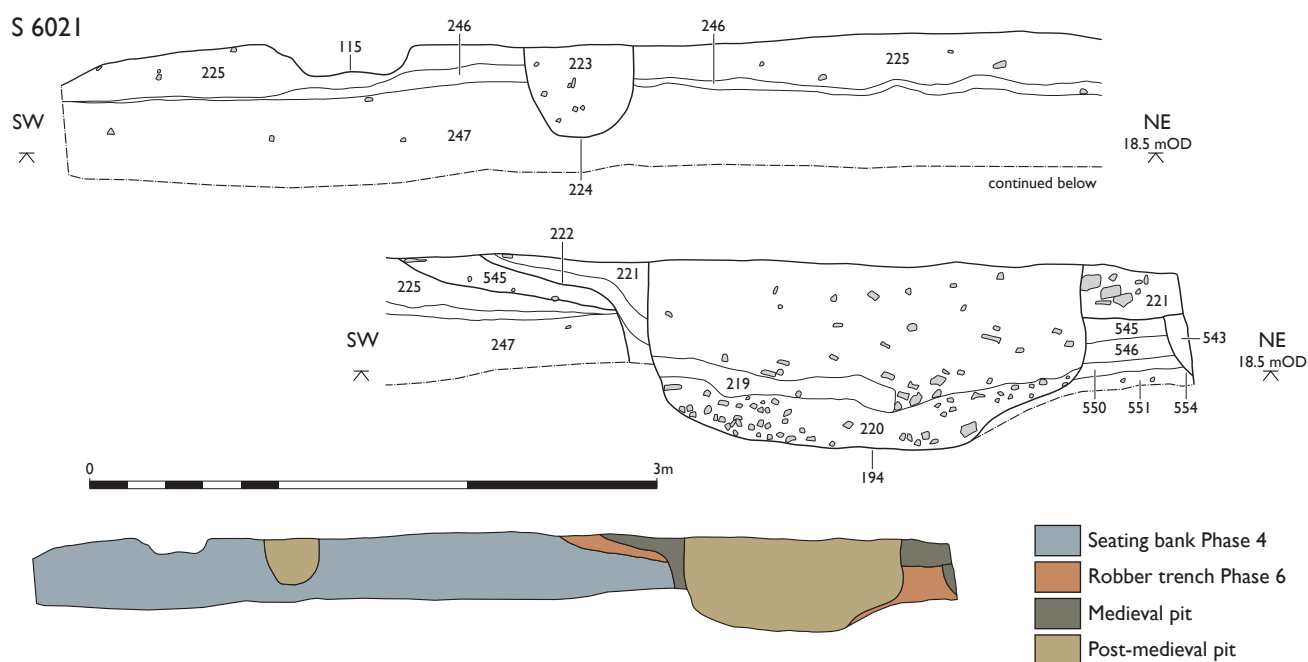


Fig 52 Section 6021, showing surviving seating bank and other stratification in the northern edge of Thompson's excavation with colour interpretive summary (for location see Fig 48).



Fig 53 View of the inner face of the outer wall of Amphitheatre 1a showing the foundation trench (1124) and wall stub (548) of the radial wall.

the excavation of the narrow band of primary seating bank that survived these disturbances.

The foundation trench was a vertical-sided, flat-bottomed cut 2.05 m wide. A patch of sandstone rubble (1125=1099) comprising irregular pieces, the largest of which were 270 × 80 mm in size, survived within the fill of this feature (1124). This had the same appearance as the sandstone core-material within the foundation trench of the amphitheatre outer wall and was of a similar width. The trench had the identical stratigraphical relationship to the underlying cord-rig earthwork (1302) as the construction trench for the outer wall. A small stub of the foundation

(548) survived, where it met the outer wall (180) (Figs 53, 54, 55). The rubble foundations of the radial wall at this point were of identical construction to those of the outer wall, of identical depth, and the foundations of both walls were bonded, and clearly laid as a single operation. Figure 53 shows that, on the west side of the stub of the radial wall, a single facing-stone survived showing a western offset from the top of the foundation. This stone appears to have been bonded with the outer wall. The two courses above this, however, show no signs of bonding, and no bonding is apparent on the east side of the wall stub. This does not necessarily mean that the radial wall was secondary to the outer wall, as Fig 53 shows that the foundations of the two walls were bonded. There are several examples of Roman military structures where bonding between contemporary walls is less than perfect. A good example is the north tower of the principal west gate at the Hadrian's Wall fort at Birdoswald, where the side-wall was bonded to the fort wall, but only the foundations and the ninth course of masonry showed this – the intervening eight courses were butted (Wilmott 1997, 60).

The primary seating bank deposits, of which (225) was the uppermost and (1270) the lowest, ended on the line of the foundation trench suggesting that the radial wall retained these deposits on the eastern side. It seems possible therefore that (1124=1098) is an original foundation trench intended for the western side of a primary north entrance. The idea that this wall was unfinished in this phase should be considered, but whether used or not it was certainly out of use and ignored during the alterations of Phase 6 that created Amphitheatre 1b.



Fig 54 View of the outer wall of Amphitheatre 1a from above, showing the bonded stub of the radial wall and its robber trench. The underlying Iron Age cord rig is well defined.

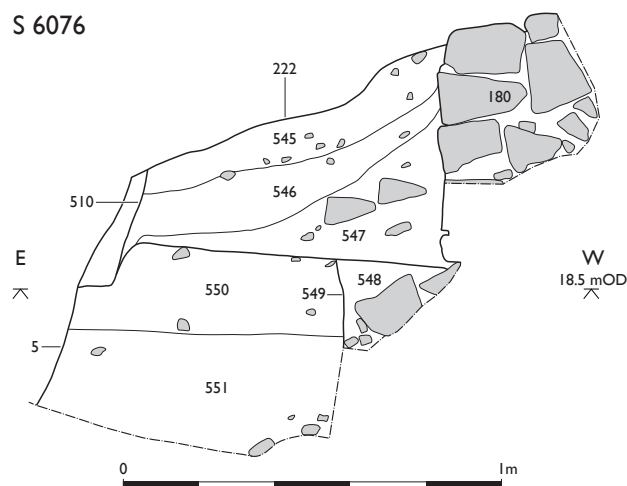


Fig 55 Section 6076 showing the stub of the radial wall (548) and the fills of the robber trench which removed the wall in Site Phase 6 (for location see Fig 48).

The primary seating bank

The primary seating bank consisted of a series of dumps deposited against the inner face of the outer wall. The earliest of these was in places discernible as a low bank, averaging 1.95 m wide and 0.30 m high running parallel to the inner face of the outer wall at a distance of 0.82 m (1164=1270=635) (Figs 56, 74, S6091). Elsewhere this

S 2006

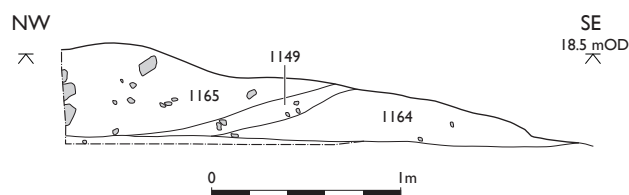


Fig 56 Section 2006 showing the lower levels of the primary seating bank. Note the basal bank deposit (1164) thought to be the upcast from the excavation of the foundation trench for the outer wall (for location see Fig 48).

banking was not so apparent (1263, 1268, 1241, 1071). This light grey-brown silty, clay containing some charcoal flecks and heat-affected stones, was difficult to distinguish from the underlying soil (1201) with its cord-rig corrugations (1302). It was clearly the same material re-deposited. The fact of its deposition on the inner side of the foundation of the outer wall suggests that this initial deposit was the upcast from the excavation of this foundation, and was deposited in order to begin the process of building an earthen seating-bank. This would mean that no upcast material from excavations in preparation for construction was wasted.

The next deposit in the sequence was a mid-brown silty sand (1149, 1238, 1264, 1265) which resembled the top of the natural subsoil (1278). This might either have been upcast from the excavation of the lower part of the foundation trench of the outer wall or from the upper layers removed during the excavation of the arena. Above this horizon the seating bank deposits varied from area to area. Figure 48 shows the overlapping deposits of dumped material representing the uppermost surviving deposits. It was clear that the seating bank deposits were thrown up without any form of structured deposition. The key fact to note about these deposits is that they were, without exception, clean redeposited natural layers which contained no evidence whatever (in the form of organic materials, finds etc) for having been taken from areas of Roman activity. They clearly comprised the natural and prehistoric materials derived from the initial excavation of the arena.

The seating bank dumps were excavated in plan under a large number of context numbers (590–594 (Fig 74), 1261, 1258, 1254, 1253, 1171, 1145, 1262–67, 1209, 1172, 1146, 1237, 1235, 1147, 1267, 1259, 1252 and 1148), and are best understood where recorded in section. In Figs 56 and 74, the initial bank of material, which was probably won from the excavation of the foundation trench for the outer wall (635=1164), was overlain by a similar slightly darker deposit (634=1149) and a thick deposit of mixed clay containing some red sand and sandstone (633=1165). The section at the northern edge of Thompson's excavation (Fig 52) shows two deposits (247, 225) of yellow-brown silt-sand separated by a layer of crushed red sandstone

(246) and other layers of mixed seating bank material (1065, 1068). At this point, (550) represented the cord-rig cultivation soil of Phase 2.

The uppermost deposits in the seating bank sequence

(1270, 1252, 1267, 1148, 225, 545, 633), (1145), (1146), (1247), (1147), (1165) were cut on the arena side by a terracing cut (1249=510=544) associated with the construction of the timber-framed seating of Phase 6 (p 95).



Fig 57 Inner face of the outer wall of Amphitheatre 1 in Matthews' Trench XII.

Newstead, 1929–31

The discovery of a plan of Newstead's Trench 5, on the site of the Amphitheatre 2 *vomitorium*, Entrance 10 (p 185; Fig 193) has allowed accurate plotting of the outer wall of Amphitheatre 1 to the south of our Area A. The segment of this wall in Newstead's trench has been influential in the interpretation of the 'stone amphitheatre' by Newstead and Thompson, as it appeared to show the base of a flight of steps. Analysis of the photographs (Fig 194) in the light of the recent excavations shows that at this point the wall survived to five courses, and that the width of the wall is reduced at the sixth course by an offset, above which two courses survived (Fig 194b: for discussion see p 185). This was by far the best preserved piece of this wall ever to be discovered. It is significant that nowhere else, even in Area A, has the earlier outer wall survived above four or five courses (Fig 50), so how typical this offset is of the circuit cannot be gauged.

Trench XII

Matthews' Trench XII was excavated in the north-eastern quadrant of the amphitheatre. Here the inner face of the outer wall (M220) was recorded to a height of five courses above a narrow offset (Figs 57, 58). Figure 20 shows that this piece of wall, lying to the west of the St John's House cellar, had not been previously encountered by Thompson, although his trench numbered SJH5 (Fig 19) came very close to it. It was in Trench XII that Matthews (2001b, Matthews *et al* 2002, above p 21) recognised that the

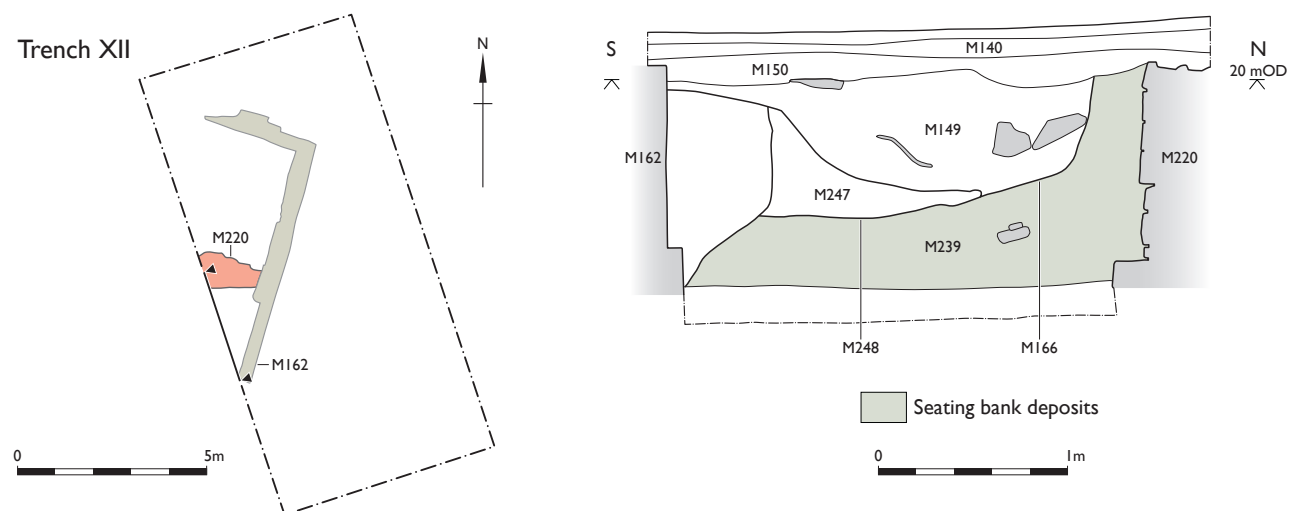


Fig 58 Plan and section of the outer wall of Amphitheatre 1 (M200) in Matthews' Trench XII. M162 is a post-medieval foundation.



Fig 59 Plan of outer wall of Amphitheatre 1a in Area B and Trench X.

primary seating bank material was dumped against the so-called ‘concentric wall’ and that this wall was therefore contemporary with the ‘grillage’. The section (Fig 58) clearly shows that the seating bank material (M239) was banked up against the inner face of the outer wall (M220).

Area B and Trench X (Fig 59)

In these areas the outer wall was the only part of Amphitheatre 1a to be recorded. At the eastern end of Area B the robbed wall was traced for a length of 7.5 m. As Area B was excavated only to the top of Roman levels, this wall was recorded in the base of a deep robber trench

of Phase 11 (2454/2516: for details of robbing, see volume 2 of this report) (Figs 60, 61). The surviving upper surface of the wall (2462) was exposed and cleaned to characterise the construction, and the sides of the robber trench were trimmed back in places to establish the full width of the wall. The wall was of identical construction to that seen in Area A with the core consisting of small irregular-shaped sandstone fragments bonded in red-brown clay. The inner and outer faces were constructed from roughly shaped sandstone that had been neatly dressed on the outer face and the whole wall was consistently 2.3 m in width. It was also possible to establish that the complex sequence of seating-bank deposits surviving in Area B post-dated



Fig 60 (a) Surviving footings of the outer wall of Amphitheatre 1a at the edge of Area B beneath a post-medieval stone and brick wall. (b) Seating bank deposits against the inner face of the outer wall in Area B.



Fig 61 Vertical view of the robbed outer wall of Amphitheatre 1a in Area B.

the construction of the wall. Robbing had reduced the height of the wall to varying degrees along the exposed length with the greatest survival on the southern edge of the trench, where the wall intersected with a *vomitorium* wall of Amphitheatre 2 (2527: p 180).

In Matthews' Trench X, a wall lying beneath the side-walls of the Amphitheatre 2 east entrance was initially interpreted as the side-wall of a drain or tank containing water-lain deposits (Matthews *et al* 2003). It is now identified as a continuation of the outer wall of the first amphitheatre. The recognition of this is of the first importance in demonstrating that Amphitheatre 1 did not have entrances on the short axes of the arena. The wall was robbed away virtually completely when Amphitheatre 2 was built. Four facing stones of the outer face of the wall (M493) survived (Fig 62). The inner face was wholly robbed, but the edge of the robber trench was recorded (M319). Between the edge of the robber trench and the surviving face was a mass of small sandstone rubble in a reddish clay-silt matrix. Some of this may have been wall core and foundation, but it seems also to have comprised robber trench fill (M242).

Trench 18

The outer wall was located in this trench excavated in 1993 with the specific aim of locating Thompson's 'concentric' wall (Buxton 1993, 95) (Figs 24, 145). It measured 1.5 m square. The top of the wall lay 0.75 m below the floor level of Dee House. At least six courses of the inner face



Fig 62 Outer face of the outer wall of Amphitheatre 1a in Trench X. To the left of the image the foundations of the south wall of the east entrance to Amphitheatre 2 can be seen oversailing the earlier wall.



Fig 63 Plan of the outer wall of Amphitheatre 1 in Trench 18.

of the wall (B151) were seen. An extension to the trench revealed the core of small sandstone pieces bonded with brown clay (B337; Fig 63). The material found against the inner face of the wall included ‘stones, bricks, mortar and carbon’, and was tentatively interpreted by the excavator as the base of the seating bank (Buxton 1993, 95). The character of this material, however, strongly suggests that a later pit had been cut against the face of the wall.

Watching brief

The outer wall was seen in the section of a service trench to the south of Dee House (Fig 161, G308).

Finds and dating

By Gillian Dunn, Alison Heke, Margaret Ward and Tony Wilmott

The re-deposited material dumped against the inner face of the outer wall to form the seating bank produced seventeen fragmentary and abraded Roman pottery sherds (p 284). In addition to the local oxidised and reduced wares there was a mid-late 1st-century Pompeian Red Ware dish and sherds of a white ware beaker with traces of orange paint from (635) reflecting a mid-1st – early 2nd-century date (Pot Cat no 2, Fig 272). A single undiagnostic (though probably Flavian) sherd of samian ware was found in (545).

There were only two small finds from this phase, both fragments of frit melon beads, typically dating to the 1st – mid-2nd century, from seating bank dump (1270) (p 331, Func Cat nos 60, 61). The seating bank deposits also contained forty-three fragments (906 g) of undiagnostic Roman CBM. The quantity of mammal and bird bone was insufficient for analysis. This contrasts with the fish bone, of which there was a substantial assemblage (p 415).

The relative lack of finds in these dumps confirm their origin as redeposited natural material derived from the excavation of the arena, with some admixture of rubbish including material from the immediate pre-amphitheatre occupation. This further suggests an early date for the construction. Unfortunately the local pottery is only broadly dateable to the late 1st – early 2nd century. However, the two Vespasianic coins (CO 21, CO 22) found in the disturbed cultivation soil (1288) and the final sand deposit (1086) of the preceding phase, which was cut by the outer wall of Amphitheatre 1 (pp 73–74), combined with the spread of stratified coinage in later phases (p 157), would suggest that construction may not have long post-dated the deposition of these coins. The coins provide a *terminus post quem* (TPQ) for construction of c AD 71.

AMPHITHEATRE 1a USE (Phase 5)

Area A

Evidence for activities in the area immediately around Amphitheatre 1a consists of deposits accumulated against the outside of the outer wall in Area A. The deposits outside Amphitheatre 1 were heavily truncated by later features. They can be identified by their relationship to features of Phase 6, and the construction of Amphitheatre 1b.

South-west area (Fig 64)

In the south-western area of the excavation, beyond the wall of Amphitheatre 2, was a large sub-circular pit (1256) measuring $4.0 \times 1.2 \times 0.5$ m (Figs 64, 65). The primary fill of this pit was a sterile dump of mixed and redeposited natural clay (1248). Above this was a charcoal rich deposit (1246), overlying which was a sterile fill of red sand (1245),

possibly deposited as a capping layer in the pit. The upper fill (1244) was a grey sandy loam. Fills (1244), (1245) and (1246) were initially excavated as a single fill (1202, 1216). The uppermost fill in pit (1256) was a capping deposit of mottled brown clay (1215).



Fig 64 Plan of Site Phase 5 deposits outside the walls of Amphitheatre 1 to the south-west.

This pit did not contain any direct evidence for its use as a cess pit, however the recurring capping deposits within the pit suggest that it was emitting unpleasant odours (possibly as the result of all the rotting rubbish cast in to it (p 87)). When viewed with the evidence for another broadly contemporary cess pit adjacent to the north entrance, and a further pit found in the watching brief to the south of the amphitheatre (p 89), it seems probable that these pits represent the latrines serving the spectators visiting Amphitheatre 1a. It is also clear that the pit was either regularly cleaned out or had a relatively short period of use before it was systematically backfilled with rubbish.

Associated with the pit was a small sub-circular post-hole (1192), which contained a mortar-rich fill (1191). Adjacent to this was a small sandstone block (1193) which may be a post-pad. Both features may have had a structural function associated with cess pit (1256). To the south of this layer a shallow depression (1134) was recorded as a cut into layer (1273) that was deliberately backfilled with red sandstone fragments (1133) as an immediate precursor to the laying of the first road surface in this area. These features were subsequently covered by a layer of red sand (1152) which had mainly formed over the area of backfilled pit (1256).

Immediately outside the wall of the amphitheatre the earliest deposit of this phase was a dark brown/ black deposit containing charcoal, iron slag and finds material (1075). Above this a rectangular area of fine grey sand (1073) measuring 2.2×1.23 m was interpreted as possibly a floor surface for a small stall. A small patch of mortar, unrelated to this sand deposit (1072), may have

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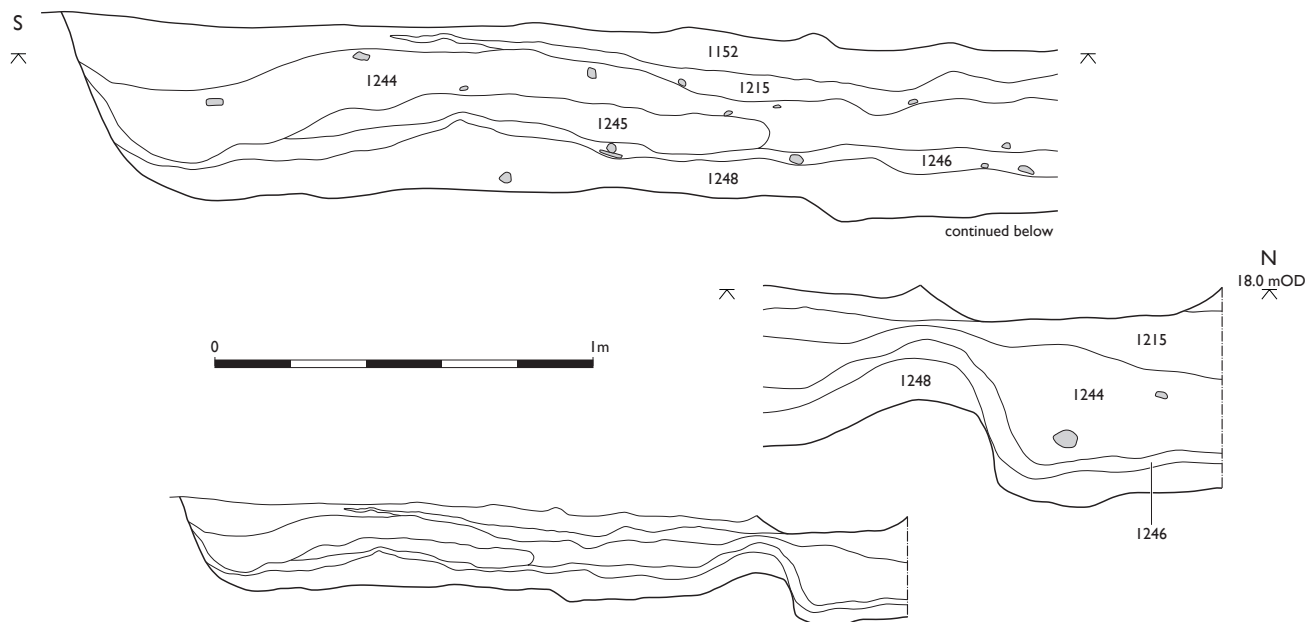


Fig 65 Section 6230 of pit (1256) (for location see Fig 64).

belonged either to this phase, or to the construction of the amphitheatre. Both these deposits were sealed by a grey, compact, silty clay layer (625). A total of 24.7 sq m of this deposit, which was 0.08 m deep and contained an extensive finds assemblage, was excavated. This was the final layer associated with the use of Amphitheatre 1a, and was cut by the foundation of the staircase base engaged to the exterior face of the outer wall, which was one of the key indicators of the renovation of the building creating Amphitheatre 1b (p 89).

North-west area (Fig 66)

Adjacent to the postulated north entrance, and beyond the line of the outer wall of the second amphitheatre was a second large cess pit. This was cut into the earliest recorded artificial deposit of Roman date, a red-brown sand dump (1076). The pit (1078) was large and shallow, measuring 4 m long, 1.7 m wide, but truncated by the outer wall of Amphitheatre 2 and by the edge of excavation. The pit, 0.5 m deep, contained a primary silt deposit (1114) followed by a greenish-grey soft silt (1100) interpreted as evidence for use as a cess pit. It was sealed by a red sand fill (1077).

Above the spoil and levelling deposits near the north entrance, a levelling deposit of crushed sandstone was laid (1074, 1105). The top of this surface lay 0.38 m above the level of the original ground surface (18.41 m OD). This deposit was laid in preparation for a coarse metallised surface, representing the earliest formal surfacing outside the amphitheatre (1059). Above this lay a deposit of

crushed sandstone (1070), probably intended to level up a pot-hole. A sub-oval post-hole (1051) 0.20 m in depth and measuring 0.38 × 0.20 m in plan was cut into this deposit. It was filled with angular packing stones, including a large fragment of amphora (1052). This may represent the first of a series of small temporary structures built against the amphitheatre wall. The post-hole was sealed by a deposit of red clay-silt (1061), a layer of sandstone make-up (1035), and a sandstone and sand rough metallised surface (1036).

Trench 48 (Fig 139)

South of the amphitheatre in this trench was a rock-cut pit measuring 1 m square in plan and 1.20 m deep (Fig 139; G205). The primary fill (G206) was a clean red clay-sand 0.55 m thick, sealed by green-brown sand-silt (G203) 0.20 m thick which contained a lens of white lime and was rich in animal bone, pottery and shell. The upper 0.55 m of the pit was filled with a grey-brown clay-silt (G202) containing an abundance of pottery, animal bone, ceramic and stone building material (Garner 2001). The similarity in location and fill of this pit to those in Area A suggest that they are contemporary and share the same function.

Finds and dating

By Gillian Dunn, Alison Heke, Quita Mould, David Shotter, Margaret Ward and Tony Wilmott

Contexts of this phase produced a large quantity of finds, for example the 54 copper-alloy fragments and objects recovered is the largest copper-alloy assemblage from any Roman phase on the site. Much of the pottery was recovered from the processing of samples, and the sherds are consequently small; the samian ware assemblage, for instance, comprises mainly fragments weighing less than 10 g, and over half of the sherds (representing a maximum of 109 vessels) are mere scraps weighing <1 g. The earliest are products of the Neronian-Vespasianic period, including a stamp by a potter active AD 65–95 (Sam Cat no 6), and the great majority is dated within the Flavian period. Moulded bowls comprised 41% of the identifiable vessel-types and includes Domitianic products; bowls of form 29 and 37 are represented in the ratio 7:17 (for significance, see pp 231, 248–51). Amongst the potters' stamps, one of two that are dated certainly after AD 85 was found in Phase 5 (Sam Cat no 8, Fig 243).

All of the pottery without exception is dated to the 1st or 2nd century. Most contexts contained some Roman CBM, of which material 2,607 fragments (17,207 g) came from Phase 5. Only a small proportion of this total comprises diagnostic pieces, but these include a range of forms including roof tile, box-tile and brick. A large assemblage of 629 fragments (3,427 g) of daub was also present. A small quantity of painted wall plaster (52 fragments (614 g)) features colours ranging from shades of yellow, through red and blue/green to plain white. The distribution of animal

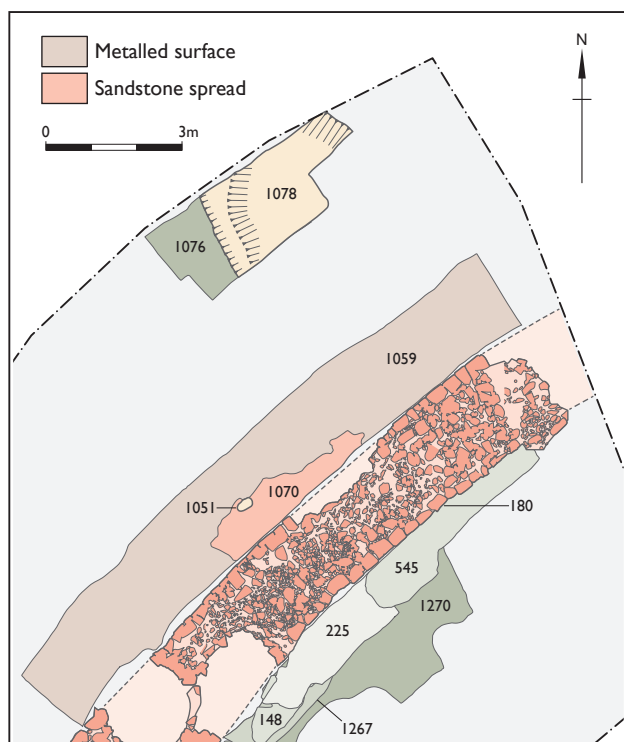


Fig 66 Plan of Site Phase 5 deposits outside the walls of Amphitheatre 1 to the north-west.

bones from the main mammal groups (cattle, pig and sheep) shows a distribution of 50% cattle followed by sheep and pig in approximately equal numbers (p 385, Table 90). Bones of all species include predominantly meat-bearing elements, providing evidence for meat consumption, though there was also an admixture of butchery waste. There was a large assemblage of fish bone, representing nearly every species recorded generally from the site (Table 134).

The earliest deposit of this phase outside the amphitheatre wall (1075), produced 110 coarse pottery sherds (824 g) (p 286) mainly locally-produced coarse wares. Traded and imported wares include a Lyon ware black colour-coated vessel, one small fragment of Dorset BB1 and Spanish amphorae including Dressel 20 and Cadiz types. Among the samian ware is a moulded bowl dating c AD 65/70–80 or a little later (Sam Cat no 10). Of twenty-one fragments of glass from (1075), all but five of which are from samples, only one can be identified to a vessel form. Other fragments are from blue-green, colourless and green-tinged colourless vessels and one fragment of window. The context also contained fragments of copper-alloy, pieces of waste lead and a small block of lead.

Cess pit (1256)

A paleoecological sample from the south-western cess pit (p 377) produced charred plant remains including a mix of cereal grain, chaff and seeds of ruderal, waste or other disturbed habitats (*Chenopodium album* (fat hen), *Polygonum aviculare* (knotgrass), *Malva* sp (mallow), *Plantago lanceolata/media* (plantain)), grassland (cf *Potentilla* sp (cinquefoils), small seeded leguminous taxa), or wet ground taxa (*Eleocharis palustris* (spikerush), and *Carex* species (sedges)). A single seed of blackberry/bramble (*Rubus subsect gladulosus*) was not charred, possibly surviving unaltered due to the tough seed coat or somewhat anaerobic conditions. Cereals identified included both hulled barley (*Hordeum vulgare*) and hulled emmer or spelt wheat (*Triticum dicoccum/spelta*). An identifiable glume base confirmed the presence of spelt wheat (*Triticum spelta*). Charcoal was abundant, and was dominated by oak (*Quercus* sp) with some diffuse porous types which were not identified.

The fills (1064, 1246, 1202, 1216) of the pit produced 607 sherds of coarse pottery (p 286), again mainly locally-produced oxidised and reduced wares, and all dated to the later 1st century. Imported and traded wares were southern Gaulish and southern Spanish amphorae, Dorset BB1, Lyon colour-coated ware and white wares. Despite the fragmentary nature of the material, a fairly wide range of vessel forms seems to have been present including amphorae, beakers, bowls, jars, dishes, flagons, lids and mortaria. The material also seems to reflect the use of the feature as a general refuse pit. A fragment of a lamp from (1216) (Func Cat no 128) is the only such object recovered from a stratified Roman phase. Another identifiable form is a tazza from (1202). Four sherds of

glazed ware were recovered from (1216) (Pot Cat nos 15 and 16, Fig 271). Among the samian ware, one dish surviving in almost complete profile in (1216), probably a Flavian product, displayed little wear from use (Sam Cat no 9). The assemblage is a closely dated group of late 1st-century date.

Amongst the glass assemblage from these fills are the rim of a facet-cut beaker (Glass Cat no 3, Figs 284, 285), a base fragment of a blue-green ribbed bowl (Glass Cat no 4) and three fragments of frit and glass melon beads (Func Cat nos 62–65), a fragment of a polychrome ?bowl (Glass Cat no 2, Fig 282) and a green-tinged colourless beaker or cup (Glass Cat no 5). The glass assemblage alone would suggest a 2nd-century date. The only window glass was a highly unusual domed pane (Func Cat nos 208, 209, Fig 315).

Copper-alloy finds from this pit included the base of a circular seal box (Func Cat no no 87), and a small fragment of thin sheet from (1202), and from (1216) a stud with the image of a 'human' face (Func Cat no 32), strips and ?offcuts of metal. Thirty four fragments of lead consisted mainly of pieces of waste and strips but also five fragments of rod, varying in length from 29 mm to 62 mm (Func Cat no 258). Fill (1216) also yielded two amber beads (Func Cat nos 65, 67) and a fragment of a bone ?disc (Func Cat no 257). Also from this context came a coin (CO 31, p 217) of Domitian, dated to AD 85 and a chalcedony intaglio depicting a male comedy mask (Func Cat no 54). The pit was also used for the disposal of animal waste and a relatively large and varied animal and fish bone assemblage came from these contexts (p 410, 417), while charred plant remains included cereal grain and taxa related to waste and disturbed ground, and also of wet habitats (p 377). The presence of dog coprolite from one of the samples and of rodent bones showing signs of digestion suggest that animals may have been scavenging from the pit during the rubbish tipping episodes.

The red sand layer (1152), which subsequently sealed the pit, produced a fragmentary and in some cases weathered assemblage of 108 sherds comprising in the main a similar assemblage of locally produced wares as the pit fill, and of a similar date (p 386), but also including fragments of a Cologne black colour-coated vessel and a Dressel 20 amphora. There are also sherds from two samian bowls, one dated c AD 65/70–80 or a little later (Sam Cat no 10), the other probably Domitianic (Sam Cat no 14). Copper-alloy objects include small fragments of sheet, a flat-headed tack (Func Cat no 109) and a stud with a decorated head (Func Cat no 96). There are also fragments of waste lead and lead rod, a conical iron ferrule (Func Cat no 1), an ox goad (Func Cat no 94), and broken iron links and strap fragments.

Cess pit (1078)

The relative paucity of finds from the second large cess pit at the north-east end of Area A (1078) is in contrast to the varied assemblage from pit (1256). Its fills produced

112 sherds (p 286). The pottery from pit fills (1100, 1114) was in a poor abraded condition and comprised mainly local grey, orange and black-on-brown wares, and one sherd of Dressel 20 amphora. The pit produced two small fragments of copper-alloy sheet, fragments of waste and sheet lead, and an almost circular lead object with a central perforation (Func Cat no 251). Layer (1077), which sealed the pit, produced a fragment of plate armour (Func Cat no 8), 39 sherds of 1st/2nd-century local oxidised and reduced wares and a moulded samian bowl of Flavian date (Sam Cat no 19). An important find from this deposit was a small fragment of portable oven (Func Cat no 211).

Other deposits

At the south-western end of Area A, the second occupation layer against the amphitheatre wall (1073) produced only eight sherds of pottery predominantly in local fabrics and a fragment of a 1st-century pillar moulded glass bowl (Glass Cat no 6).

This was sealed by the widespread final layer associated with the use of Amphitheatre 1a (625) which was the richest in terms of finds and zooarchaeological remains in the whole of Area A. It produced a large assemblage of pottery (p 287) dating uniformly to the 1st – early 2nd century, though it also includes a single sherd of Dorset BB1 (usually dated AD 120+, but see below p 157–8). The majority was from local sources, primarily Holt, Wilderspool and the Cheshire Plain kilns. There were also fragments of southern Spanish and north Gaulish amphorae. The small group of fine wares included Gaulish colour coats, a glazed ware beaker, black and red colour-coated vessels, orange mica-dusted and white eggshell wares. Despite the quantity and range of vessels, there was a notable absence of mortaria.

The latest products in the samian ware assemblage of Phase 5 came from (625). These include a dish stamped by a potter who was active AD 85–105 (Sam Cat no 8), two further Flavian stamps (Sam Cat nos 6 and 7), moulded bowls and other vessels of similar date (Sam Cat nos 1–13), remnants of four beakers (Sam Cat nos 15–18), and a Flavian vessel which bore a graffito (Sam Cat no 20).

Among other finds (625) produced a Domitianic coin dating to AD 85 (CO 30; p 217) and two further intaglos, one depicting a *modius* containing corn ears, the other a bovine (Func Cat nos 52; 53, Fig 302). A very large number of links of iron mail (*lorica hamata*) came from this deposit and the fill of cess pit (1256) (p 316) in a concentration which must be significant. An armour buckle (Func Cat no 17), an iron finger ring (Func Cat No 49), and over two hundred fragments of hobnails (p 332) came from this context. A small number of broken ‘figure-of-eight’ links from chains that could have been put to a number of uses were recovered from (625) and also from (1077) and (1152). The deposit also yielded a 1st-century trumpet brooch (Func Cat no 40) and a group of copper-alloy tacks (flat-and dome-headed), pins, a

?stud, rivets and nails, as well as pieces of sheet and strips. Ninety-five fragments of vessel glass from this context (95% of which are very small, being recovered from samples), consisted primarily of blue-green vessels including bottles, but also pale green, blue and colourless vessels, including the body fragment of a conical facet-cut beaker (Glass Cat no 1). There is also one fragment of a frit melon bead (Func Cat no 62) and three fragments of matt-glossy blue-green window glass, one of which has a possible grozed edge. The vessels from this assemblage suggest a date of late 1st to mid-2nd century and the window glass is of the type dating from the 1st to 3rd centuries. Most of the lead from Phase 5 (68%) came from (625) consisting mainly of droplets, casting runs and unidentifiable pieces, fragments of offcuts, strips and sheet. The only identifiable object was a disc, possibly a weight (Func Cat no 253). One other piece of note is an irregular-shaped block of lead (Func Cat no 250). Among the CBM was a Warry group *A tegula*, dated between c AD 100–120.

Context (625) also produced a wide range of animal bone. An unusually large amount (for this site) of chicken and woodcock bones came from this context (p 409, Table 122), together with some song birds such as blackbird and thrush, butchered bones of red deer, two hare bones and single bones of cat and dog. The context contained the largest quantity of small mammal/rodent bones from any context by far (twice as many as in the context containing the next largest number, which was a Phase 6 seating-bank deposit in Area B (Table 120)), a third of which showed signs that they had been eaten, digested and excreted, though whether by dog, cat or raptor (eg owl) could not be determined. Given the species represented, the latter is the least likely (P Baker, pers comm). Fish bone of a variety of species was abundant (p 418), including bones of Spanish mackerel (p 430, Fig 332). The deposit also contained a substantial amount of oyster shell (Carrott and Beacock 2009).

At the north-east end of Area A, comparable deposits to those from the south-west produced startlingly fewer finds. Post-hole (1051) contained a small group of pottery sherds, and a fragment of Dressel 20 amphora from the fill (1052) may have served as packing material in the post-hole along with a number of angular stones. Layers sealing the post-hole (1061, 1035, 1036) produced predominantly coarse wares with one sherd of fine orange mica-dusted ware. Vessel forms were difficult to identify and the condition of the pottery varied. The overall date range of this group would again appear to be late 1st – early 2nd century. Also from this area were lead waste from (1061) and a possible lead weight from (1036) (Func Cat no 206). Context (1061) produced the third coin from this phase (CO 29, p 217) which, like the other two coins was a Domitianic issue, also dating to AD 85.

Cess pit G205

A palaeoecological sample from the pit was rich in calcium

phosphate concretions and mineralised seeds or fruit stones which are generally associated with cess waste. The most numerous are mineralised kernels of a *Prunus* species, probably plum (*Prunus domestica*), cherry (*Prunus avium/cerasus*) or sloe (*Prunus spinosa*). As little of the outer part of the fruit stone survived, it was difficult to identify species, but they are all likely to have been eaten and to derive directly from faecal material. A small number of seeds which are also likely to represent food waste were tentatively identified as garden parsnip (cf *Pastinacea sativa*), and lentil (cf *Lens culinaris*). Weed seeds such as possible clover (cf *Trifolium* sp), goosefoot/cleavers (*Galium aparine*) and dock/knotgrass (*Polygonum/Rumex* sp) may have grown in the near vicinity of the pit, or have been thrown in with other debris. In particular, they may have been collected with straw or hay which was commonly added to cess-pits to dampen down noxious smells. Other food debris which could represent kitchen waste included occasional fish bones (although these could also have passed through the gut), hazelnut shell and charred cereal grains. These remains were found only in small quantities (Pearson 2001). The upper layers of the pit contained animal bone including predominantly pig and cattle remains (Smith 2001). It seems most likely that this was a cess pit later used for rubbish disposal.

AMPHITHEATRE 1b: STRUCTURAL ALTERATIONS (Phase 6)

Of the three amphitheatre phases now recognised, there is the most evidence for Amphitheatre 1b, both in terms of its construction and its use (Phase 7). The structural alterations which created Amphitheatre 1b were extensive, and erased most of the evidence for the earlier phase (Fig 67). Virtually the only element of Amphitheatre 1a to survive was the outer wall. The whole seating arrangement was changed by the replacement of the earthen seating bank with a more formal timber-built framework. The pattern of access to the *cavea* was also altered. The radial wall interpreted as the western side-wall of the Amphitheatre 1a north entrance was robbed out implying the remodelling of the entrance. In addition, access to the rear seating was provided by means of external staircase(s) positioned against the outer wall. The extant arena wall also appears to belong to this phase, and the evidence suggests that the arena itself was deepened. The key information for the interpretation of this phase derives from Area A.

Area A

The outer wall and external stair

The outer wall of Amphitheatre 1a was retained. An external stairway was built along its face (Fig 68). The shallow foundation for the stair was cut into the final layer

associated with the use of Amphitheatre 1a in Phase 5 (625).

The stair was principally represented by its robber trench (245), though a small fragment of its foundation trench (1062) and stone footings (646, 602, 654) survived (Fig 68, 69). The foundation was 6.24 m long and 0.92 m wide. Along its outer face were three rectangular projections, each 0.90 m in width, and projecting 0.32 m. One of these was located at each end of the foundation with one in the centre. These may have acted as buttresses but were more likely decorative features. The surviving masonry fragment consisted of six large, flat sandstone blocks bedded into grey mortar and packed with smaller sandstone fragments. The mortar and core of the stair were different from those of the outer wall, and the shallow stair foundation was cut through deposits that butted the outer wall. These facts in combination indicated that the stair was an addition.

Robbing of the radial wall

The alteration of the *cavea* and the insertion of the timber seating framework (below) necessitated the demolition of the radial wall postulated above as the side-wall to a northern entrance to Amphitheatre 1a.

In preparation for the insertion of the timber seating most of the earthen seating bank of Amphitheatre 1a was cut away, leaving a strip of the original material 1.0–1.5 m in width against the inner face of the outer wall (below). It seems that the radial wall was robbed before this took place. The stub that survived was sufficient only to ensure the stability of the outer wall to which it was bonded (Figs 53, 54). It lay at the end of a robber trench cut through the seating bank, and was backfilled before the seating bank was removed to accommodate the timber work. The robber trench (549=986) was cut through the seating bank deposits, of which (225) was the uppermost. Figure 55 provides an east-west view of the deposits within the robber trench (549), which are also seen in the north-south section Fig 52. These deposits began with the light grey-brown material characteristic of redeposited cultivation soil (551), and then successive, mixed, grey-brown sandy silts (550), red sand mixed with grey silt and natural red sandstone (547), which sealed the last vestige of the robbed wall, then grey-yellow (546) and red-brown (545) clay-silt layers.

The robbing of the radial wall suggests that the re-siting of the north entrance was an aspect of the remodelling in this phase. The most likely location for a new entrance would be on the line of the later north entrance to Amphitheatre 2, but the depth of this entrance would have removed all trace of its predecessor (Fig 70).

The timber-framed seating structure

Discovery

The timber-framed seating which, as we can now demonstrate, was inserted into the primary seating bank of Amphitheatre 1, was first discovered and recorded by

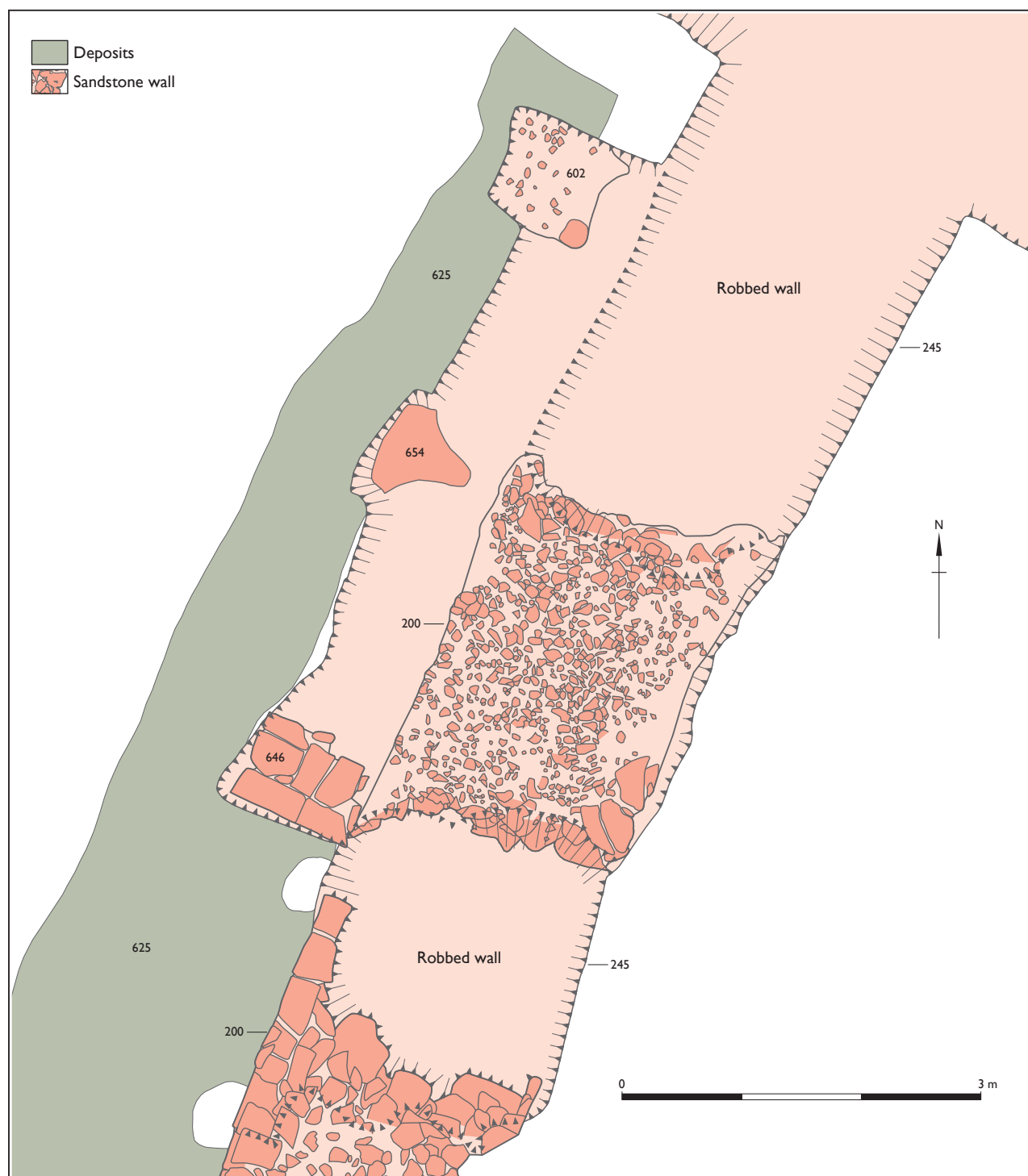


Fig 68 Detail plan of the robbed external stair and surviving stone footings.

Thompson (pp 14–16). It was the evidence upon which he based the idea that the first phase of the amphitheatre was entirely timber built. Initially a pattern of evenly spaced radial beam-slots was found, intersecting with two similar slots (called ‘lateral’ by Thompson) which were concentric with the arena wall and the outer wall (shown in red in Thompson’s published plan, Fig 20):

‘The beams themselves, although totally decayed, could be shown to have had a scantling of one Roman foot, since they were detectable as beam-slots of fibrous material in the filling of the beam-trenches which was itself different from the surrounding soil’ (Thompson 1974, 356).

During Thompson’s initial identification and excavation of these features the term ‘grillage’ was coined for the



Fig 69 (a) Robber trench of external stair from the north. Note surviving stonework at the far end of the trench. (b) Robbed stair from the east to show the differential in depth between the robber trench for the outer wall and that of the stair. (c) Surviving stonework at southern end of stair foundation.

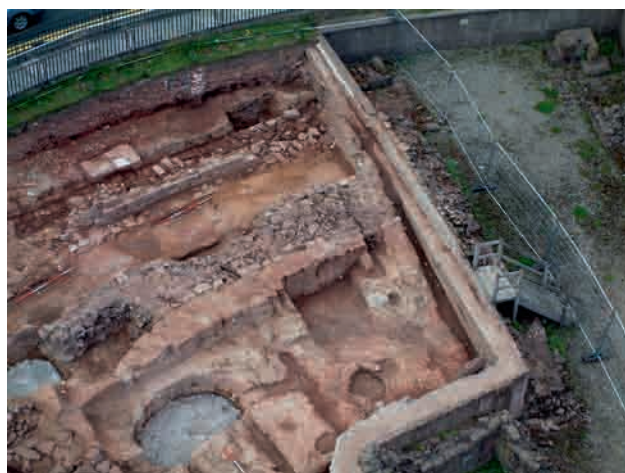


Fig 70 Photograph to demonstrate the disparity in depth between the radial wall of Amphitheatre 1a and the north entrance of Amphitheatre 2. The Amphitheatre 2 entrance has probably eradicated all trace of the entrance of Amphitheatre 1b.

pattern of beam-slots (Thompson 1976, 136) and this term has become widely used in the discussion of the structure. The term, however, conceals the complexity of the structure as now understood, and will not be used in the following description. The slots, Thompson found, were cut into a flat ground surface, and were sealed by re-deposited material which had originally been thrown up from the excavation of the arena. In the surface of this re-deposited material Thompson identified the traces of upright structural members which became visible in plan following machine-stripping of the *cavea*. These were best preserved in the north-east quadrant of the *cavea* (Thompson 1976, pls xxxiv, xxxv: Fig 105). The uprights were found to have been laid out along the lines of the radial slots, and Thompson identified four alignments of four posts each



Fig 71 Thompson's photograph of the portion of Area A excavated as an area in 1968 (his area A68/5, Fig 19). The post-holes of timber uprights are marked by pegs. These timber frames were not further excavated by Thompson.

(Fig 71). When these alignments were identified, Thompson recorded them conventionally as post-holes. Only one post-hole appears to have been examined in section to locate and explore its junction with the beam-slot (Thompson 1976, pl xxxv b: Fig 72). From the evidence of the beam-slots and the post-holes, Thompson concluded that the timber-framed seating comprised ground-fast beams and uprights, but was surprised by the apparent absence of evidence for diagonal bracing elements. Sunter's (1976, 222–30)



Fig 72 Thompson's photograph of a section of beam-slot and upright in his area A68/2, Fig 19.

attempt to reconstruct the supposed timber amphitheatre was seriously hampered by this finding, and he mentions it twice in the space of a page:

'The archaeological evidence suggests that there was no cross-bracing below a level approx 2 ft (0.6 m) above the tops of the sill-beams'

and

'On the assumption, then, that if cross-bracing had existed at low level within the radial timber-frames some at least would have shown up as dark patches during excavation, we are forced to assume that none existed at this level' (Sunter 1976, 225–6).

In his Area A68/3 (Fig 19), the northern part of our Area A, Thompson cleared the *cavea* by machine to a distance of 10.96 m back from the arena wall. This was 0.24 m inside the terrace cut for the insertion of the timber-framed seating, which he therefore just missed. Similarly, in the area where he recorded the tops of upright posts in plan, the material dumped around the upright timber-frames survived to a depth of 610 mm above the level of the basal beam-slots.

Excavation method 2004–6

During the excavation of Area A, it became clear that a considerable amount of evidence for the construction of the timber-framed seating remained *in situ*. Only the north-eastern part of Area A had been excavated by Thompson and here the timber slots were treated as part of the base of his excavation trench. The physical evidence of these, combined with Thompson's plans, showed the spacing of the timber slots. Across the remainder of Area A, within

the outer wall of Amphitheatre 1, the uppermost surviving Roman deposit was a widespread layer of reddish-brown sandy material including a great deal of crushed sandstone (319). We follow Thompson's (1976, 139) interpretation of this deposit as re-deposited natural sand, up-cast from the excavation of the arena and used to secure the timber-framed seating in place. The upper surface of this material was carefully cleaned revealing, as Thompson had found, the tops of timber uprights represented by small, rectangular dark patches set in twos and threes radiating from the arena, and revealing the positions of radial timber-frames. Excavation around Radial timber-frame 8 (below) during the 2004 season showed that excavation of these features as post-holes (*pace* Thompson) was not an effective way of recovering all of the evidence. Knowledge of Thompson's results provided an appreciation that the timber structure as a whole, including both basal slots and uprights, comprised a three-dimensional structure of radial timber-frames, the construction of which pre-dated the deposition of the red, sandy, up-cast material. It was therefore decided, initially experimentally, to remove the up-cast material entirely in the area between the lines of two timber-frames in order to reveal the radial timber-frames as three dimensional structures in section. This technique proved extraordinarily successful; among other things it solved one of Thompson's interpretative problems by demonstrating the presence of diagonal braces as an integral part of the construction. In the case of Radial timber-frame 15 (below), the only place where the junction of an upright and a diagonal brace survived, this junction was only 400 mm above the base-plate. If this was consistent, then the traces of the diagonal braces would have been buried below the point at which Thompson stopped work, and would thus not have been visible to him in plan.

Preservation and terminology

The processes by which the timber structures were preserved in the ground are not fully understood. Certainly the timbers, diagonal, vertical and horizontal, were replaced by soil material, predominantly a dark grey-brown clay-silt, probably partially derived from the decay of the timbers, but in any event allowing the dimensions of the timbers to be measured from what were virtually 'casts' of the original members. The presence of iron nails at the junctions between several of these members showed how the framework had been assembled, but the fact that many of these nails could not have been driven into the timbers in their final position clearly showed that the timber-frames within the radial slots must have been assembled *ex-situ* as pre-fabricated parts. These would have been raised into position and joined together at ground level by the two timber beams laid concentrically to the arena and outer walls, and by further concentric timbers at a higher level.

Understanding this basic sequence allows a description of the archaeological evidence based upon the individual timber-frames excavated. Before embarking on this

excavation, therefore, the horizontal timbers were often defined in this material (1131=1184=1138=667=1190) and were excavated from this level.

In describing an oval or elliptical structure, the use of compass points to describe the relationship of one element to another is potentially confusing. In the following description the term *inner* will be used to mean nearer the arena wall, and *outer*, nearer the outer wall. If one element is closer to the arena wall than another, it will be referred to as *inside* the other. Conversely if one element is closer to

the outer wall than another it will be referred to as *outside* the first.

Ground preparation: the terrace

The key discovery that allowed the final abandonment of Thompson's idea of a primary timber amphitheatre was the demonstration of the fact that the timber-framework was constructed within a terrace cut made in the primary seating bank, the material of which had been piled against the outer wall of Amphitheatre 1.

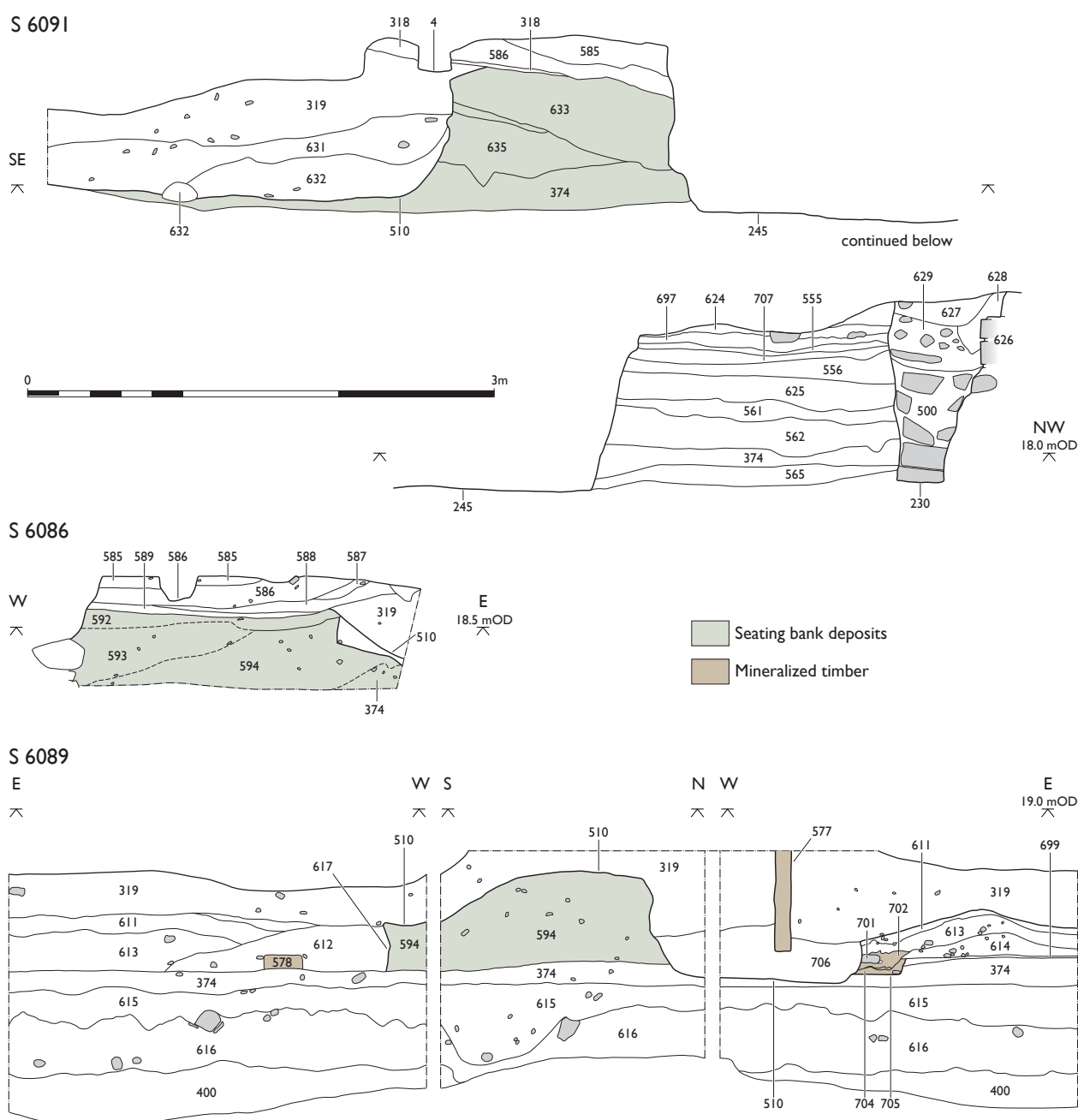


Fig 74 Sections showing the terrace cut (510) through the seating bank of Amphitheatre 1a in preparation for the insertion of the timber seating framework (for location see Fig 67).



Fig 75 The terrace cut through the seating bank of Amphitheatre 1a. The pale material to the right is the original seating bank, the cut (510) is filled with red material.

The initial seating bank would probably originally have been higher than the bank as excavated. It appears to have been reduced in height as part of the preparation for the new timber seating, and this operation was clearly associated with the robbing of the radial wall and moving of the north entrance. In the uppermost surviving deposits of the primary seating bank sequence a cut (1249=510) was defined at an average distance of 1.40 m from the inner face of the amphitheatre outer wall (180=712) (Fig 67). The cut was near-vertical, and the seating bank was almost entirely cut away within its line, to form a flat terrace within the shell of the outer and arena walls on which to build a framed, timber, seating structure (see Figs 75, 91a, 95a and sections Figs 55, 74, 91d, 95b, 99b). To the south-east, the lowest seating bank layer (1071=699), heavily truncated, formed the base of the terrace. Elsewhere the soil deposits beneath the Phase 4 seating bank were truncated in the process of terrace levelling. The surface of the base of the terrace was virtually level, ranging from 18.07–18.24 m OD. There was no clear slope in the surface, but it was slightly undulating.

On the base of the terrace a patchy deposit of brown silt sand (1239) was identified at the south-western end of the excavation. This was sealed by a sterile layer of red-brown sandstone brash (1214=1132=1158) which covered most of the base of the terracing cut. In places this sandstone brash overlay a thin lens of light grey silt (1138=1141=1162), material very similar to the underlying soils probably representing up-cast from the timber slots that were excavated in the surface of the levelled terrace. It is worthy of note that it was very hard to discern a difference between the pre-amphitheatre soils and the lower layer of terrace fill. This was only discernible where the intermediate grey silt layer survived and in the places where the terrace fill sealed the packing fill of cuts for timber-frames.

The timber-framed structure

In the following description the evidence for the ring-beams is described first, followed by that for the radial timber-

frames. The radials are described in anti-clockwise order. Two overall plans present the initial cuts into the base of the terrace (Fig 67), and the evidence for the timber members of the framework (Fig 76).

The ring-beams

A Outer ring-beam: The evidence for the outer ring-beam survived intermittently due to later truncation. In the area to the north-west of the site, the initial cut (1177) was 0.65 m wide. The fill of the cut consisted of a pale grey loamy clay (1178) above a pale red sandstone brash (1182). The fill was sealed by deposit (1131). Above this deposit this part of the ring-beam was excavated by Thompson (150) (Figs 77, 78). It is likely that the imprint in (1131), which was previously excavated and filled with Thompson's excavation backfill, was broader than the original timber, at 0.42 m. There was a slight but clear change in orientation in grid 805/170, but a later medieval pit truncated the probable junction between two lengths of timber. Further south the ring-beam was better preserved. The initial cut (1060) varied in width from 0.24 to 0.40 m. The sides were stepped, sloping to the break of slope, then vertical with a flat base. The imprint of a timber 0.22 m wide, and 0.09 m thick was represented by a dark grey-brown sandy silt (636) (Fig 74, Section 6091, Figs 91). The beam material contained iron nails (Fig 91d).

Separated by truncation from (636) was another length of slot (1033) that also contained a beam impression (1032). Dimensions and the character of the deposits were similar to those of (1060) and (636). Where this segment of the ring-beam was cut by a later pit (185, 26), its stratigraphy was recorded in section (Fig 74, Section 6089). Here, the initial cut (705=617) was 0.43 m wide and 0.15 m deep. At the base was a grey silt bedding (704, 703) above which the timber ring-beam (701=578), measuring 0.25 m wide and 0.10 m thick was represented by a dark grey-brown silty clay cast. Around the beam the packing deposits (702=612) comprised mixed red-brown and grey silt and sand.

Separated by further truncation another segment of the ring-beam trench was preserved. The initial cut (1120=511) was 0.54 m wide and 0.08 m deep. It was filled with a loose sandy material (573) which acted as both bedding and packing for a timber beam. The imprint of the timber ring-beam was preserved as a dark grey-brown sandy silt (515=509=1122) measuring 0.26 × 0.08 m. The relationship of the beam with the base-plate of radial timber-frame 15 (1119=516) was exposed in plan (Figs 99, 100).



Fig 76 Plan of Area A to show the surviving timber framework elements (for detail see individual timber slot illustrations Figs 77–101).

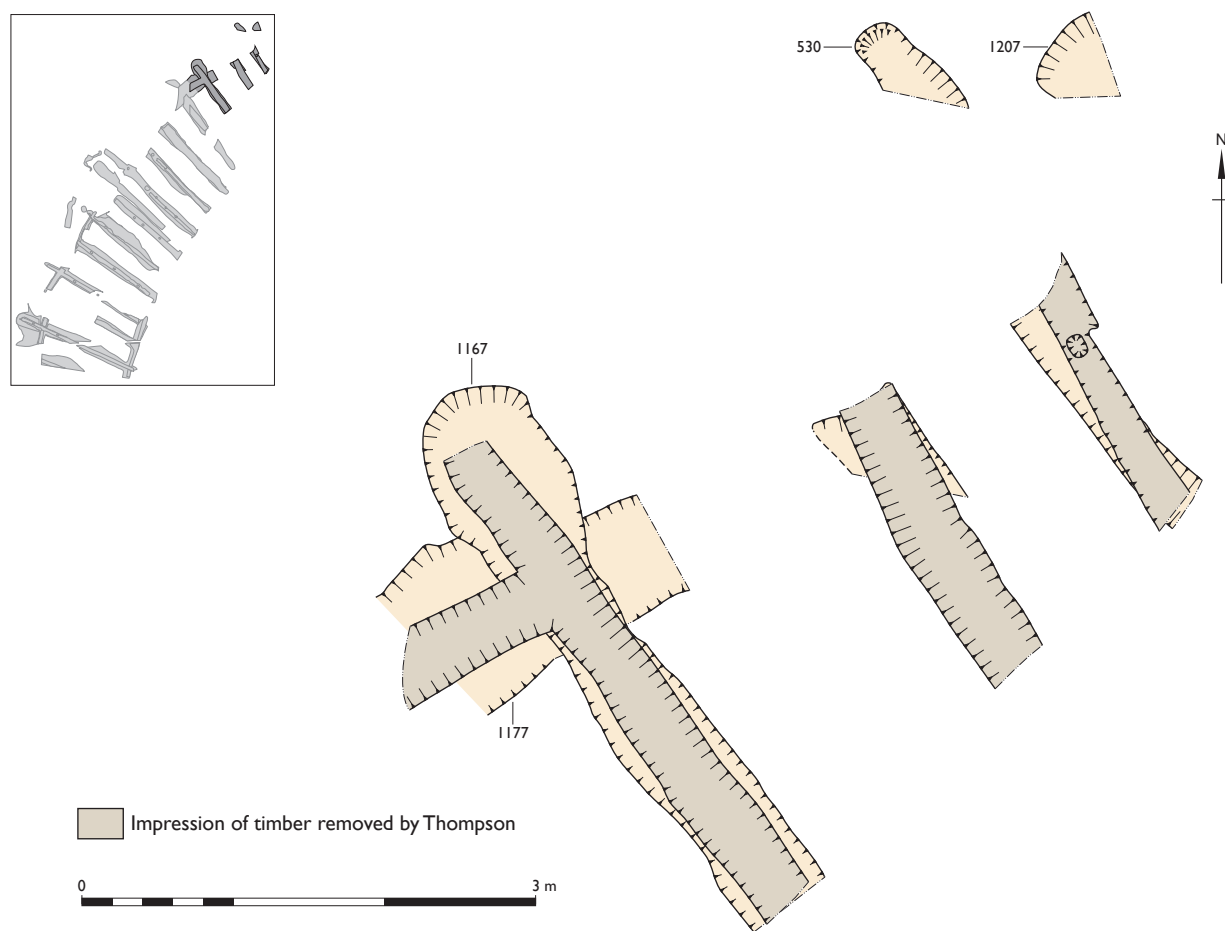


Fig 77 Detail plan of the timber slots in the area excavated by Thompson (Slots 1–4).

The preservation of the cast of the timbers gave the impression that timber wedges were placed on each side of radial base-plate (1119=516), within the joint with the outer ring-beam (1122=515) in order to hold a joint in position (Fig 100k). An upright was positioned outside the ring-beam in the line of radial timber-frame 15 (Figs 100b, d, e), and a brace was placed at the joint of the radial base-plate and the ring-beam (Fig 100g).

B Inner ring-beam: The initial cut for this beam survived between radial timber-frames (13) and (15). The initial cut (944=1166=1187) was 0.54 m broad and 0.18 m deep (Fig 97a). It was filled with red-brown silty-sand (1044=1213) which seems to have been both a bedding and a packing for a timber beam. The beam was replaced by a grey-brown, gritty sand (943=1163), and measured 0.23×0.08 m in section (Fig 98a). Two iron nails were driven into the outer side of the beam, though there was no sign of any conjoining timbers at this point (Fig 98d).

The radial timber-frames

- 1 Outer butt-end of slot for a radial timber-frame: The original cut (1207) was more than 0.36 m wide and 0.18 m deep. It was defined following the excavation of deposit (1131), which sealed the fill of the cut, a red fragmented sandstone brash (1208). No trace of the timber that had occupied this slot was recovered (Fig 77).
- 2 Slot for a radial timber-frame towards the edge of excavation. Two small sections survived truncation (Fig 77). An outer butt-end (530) was filled by a basal bedding layer (527) overlain by a grey-brown silt representing the base-plate decayed *in situ* (528, 529). A southern section 2.59 m in length (149) preserved the impression of an upright timber at a distance of 2.6 m inside the butt-end of the base-plate. This frame was cut at its southern end by the later *Nemeseum* wall, towards the western edge of excavation.
- 3 Slot for a radial timber-frame. A fragment (47) survived, 1.80 m long, 0.40 m wide and 0.20 m deep (Fig 77).



Fig 78 (a) Radial timber slots 2, 3, and 4 as excavated by Thompson looking towards the arena. The heavily truncated edges of timber (149) in slot 2 lie to the left of the picture, and a fragment of the edge of the base-plate in slot 3 is to the left of the later pit. The clear slot to the right is Thompson's excavation of the impression of the base-plate in slot 4, with his excavated timber impression of the outer ring-beam (150) at right-angles. (b) The same area during the Thompson excavations, viewed from the north-west.

- 4 Slot for a radial timber-frame. The initial cut for the slot (1167) had a rounded and expanded northern butt-end (Fig 77a). The cut survived for a length of 4.10 m and was 0.60 m in width and 0.20 m deep. It extended 0.74 m beyond the line of the outer ring-beam-slot, with which it intersected. The cut was defined following the excavation of deposit (113), which sealed its fill (1168), a mid-brown clay containing 25% sandstone fragments. The timber imprint along the line of this slot (Fig 77, 78a) defined in the surface of (1131) was 0.40 m wide, though this was excavated by Thompson, and may have been slightly over-excavated, as was this segment of the ring-beam (see slot 6). A small patch of brown silt adjacent to this slot appears to be an element of trample during construction
- 5 Slot for a radial timber-frame. The initial cut (1157) had a rounded northern butt-end which was truncated by later disturbance (Fig 79). The cut (Fig 80a) measured 7.2 m in length from the butt-end, which lay 0.72 m beyond the outer ring-beam-slot, to its junction with the inner ring-beam-slot. It was 0.60 m wide and survived to a maximum depth of 0.30 m. The fill (1156) was a mid-brown clay with 25% sandstone fragments. A narrower timber slot was defined at the bottom of the cut. This was vertical-sided, flat-bottomed, preserving the impression of a base-plate, and measured 0.26 m wide (107). It had been carefully excavated by Thompson's team, and filled with excavation back-fill, however a tiny amount of original fill survived in the edges of the feature. The slot was bisected by a post-medieval pit. On the outer side of the pit, the timber slot terminated in a clear butt-end (Figs 80b, 82b). On the inner side of the pit the timber impression resumed, and continued to intersect with the inner ring-beam (Fig 80c). This conclusively demonstrates that the base-plate was not a continuous timber, but was constructed using two timbers laid end to end in the slot, though the later pit had removed the evidence for the length of gap between the two base-plate sections.
- 6 Slot for a radial timber-frame. The slot was originally partially excavated by Thompson, but sufficient remained to reconstruct its original form and complex depositional history. The initial cut (1195) survived to a length of 6.22 m and was

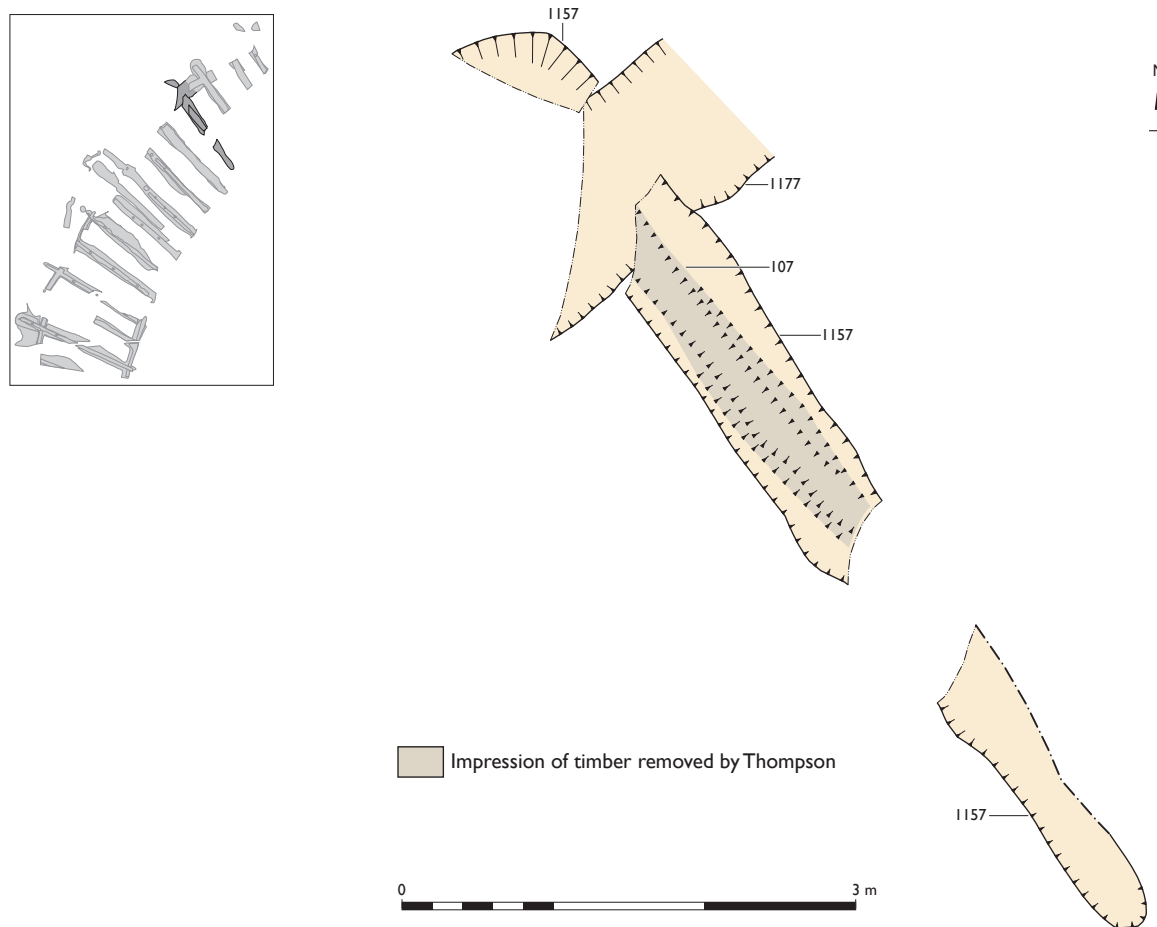


Fig 79 Detail plan of timber slot 5.

0.61 m wide and 0.30 m deep (Fig 81). It had near-vertical sides and a flat base. It had a primary fill of yellowish-brown sandy silt with charcoal flecks (1197), but most of the fill comprised very compacted red sandstone (1198). This was sealed along the edges of the slot by deposit (1131), but the imprint in the surface of (1131) was an artefact of the excavation of the slot, first by Thompson, and then in the 2004 excavation season.

Thompson excavated a linear slot 5.95 m long and 0.23 m wide, truncated at the outer end by a large medieval pit, which also removed its junction with the outer ring-beam (Figs 82a, b). The slot excavated by Thompson (137) was filled with his excavation backfill (142), and it was therefore clear where his work stopped and *in-situ* stratification began. Thompson excavated the imprint of a timber within the slot, and did so reasonably accurately. However, it soon became apparent that the timber impression had not originally been continuous. The two ends of the feature were vertical-sided and flat-bottomed, but

the central excavated portion was narrow, and meandered across an uneven and shallow stony base that turned out to comprise the secondary slot fill (1198). Careful excavation revealed the butt-ends of two timbers within the line of the slot, and it seems that the original excavator had assumed a continuous feature, and had over-dug as a result of this assumption. The base-plate here had comprised two timbers (slots 143, 145), laid in line, but separated by a space 1.62 m long. The outer slot (143) survived to a length of 2.05 m, but was truncated at the outer end while the inner slot (145), also truncated, was recorded to a length of 3.10 m. The timbers were both 0.23 m broad. This interrupted base-plate is identical and adjacent to that in Timber Slot 5 (Fig 82b). The slots had been broadened by later excavation, and the inner slot (144) had also been disturbed during excavations by Matthews in 2000, when it was re-excavated as part of his Trench VII context (25) (Matthews *et al* 2001c, 37).

Radial timber-frame. The initial cut (1169)



Fig 80 (a) The initial cut (1157) for timber slot 5 viewed from the inner end. (b) The outer segment of timber slot 5, showing the clear butt end on the edge of the intrusive post-medieval pit. (c) View from the arena of timber slots 5–7 (right to left) following the removal of Thompson's backfill, showing the junction of slots 5 and 6 with the inner ring beam. (d) The same area during the Thompson excavations viewed from the north-west showing the limit of Thompson's 'total' excavation of the timber framework in this area to the right of slot.

survived to a length of 3.70 m and was truncated at its outer end by the northern side-wall of the later *vomitorium*. The slot was 0.60 m wide and 0.2 m deep with near vertical sides and a flat base (Fig 83a). The backfill of the slot consisted of a reddish-grey sand containing fragmented red

sandstone (1170), and was sealed at the edges by deposit (1131) (Fig 83c). The slot was examined by Thompson, and was under-excavated during his work. Thompson's excavation of the slot was allocated context number (483, fill=482). Thompson seems to have excavated the fill

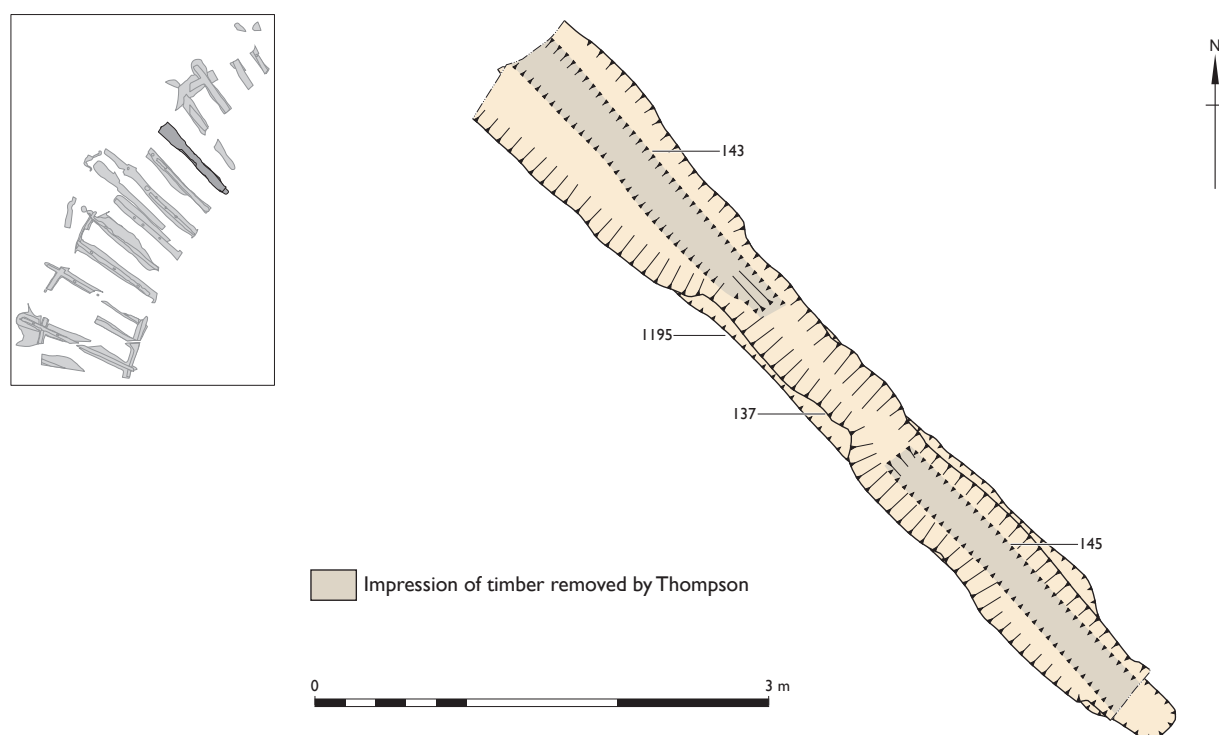


Fig 81 Detail plan of timber slot 6.



Fig 82 (a) View from the inner end of timber slot 6 showing the contrast between the way in which Thompson's team excavated the slots of the interrupted base plate, and the irregular space between. (b) The outer sections of the interrupted base-plates in timber slots 5 and 6 (right to left). It is clear that the inner butt-ends of these timbers were aligned. Towards the bottom of the picture Thompson's over-digging beyond the butt end in slot 6 is apparent.

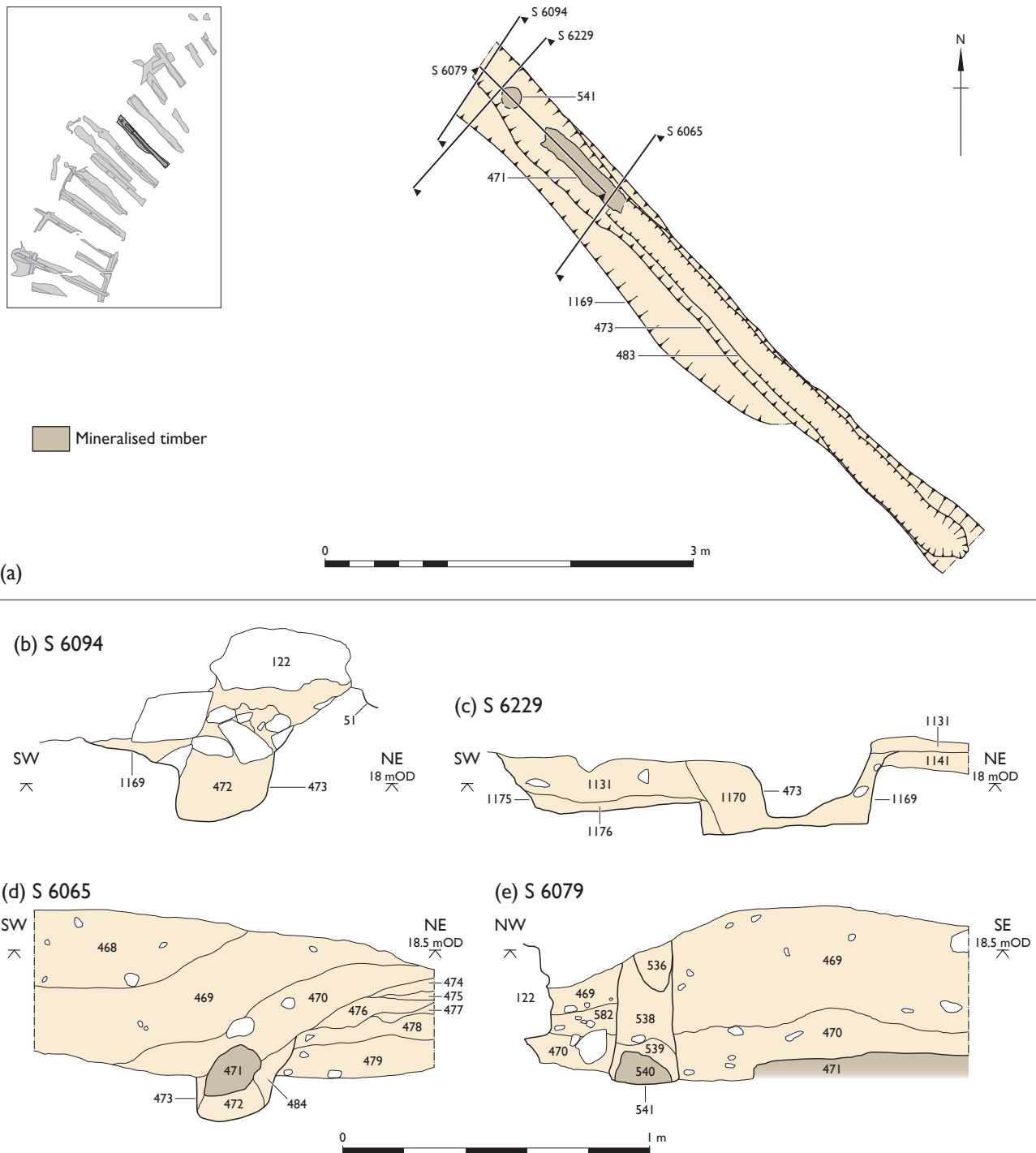


Fig 83 (a) Detail plan of radial timber frame. (b) Transverse section S6094 adjacent to the end of the later *vomitorium* side wall (122). (c) Transverse section S6229 drawn in 2006 to show width and fill of the initial cut before the excavation of the impression of the base-plate in 2004. (d) Transverse section S6065 across slot and overlying stratigraphy, showing deposits stratigraphically above those in (c) (see Fig 84a). (e) Longitudinal section S6079 at outer end of slot showing upright (561).

equivalent to the decayed timber base-plate, which was thus 0.21 m wide and at least 0.10 m thick. These dimensions were confirmed by the survival of a small length of the original fill that

replaced the base-plate (471) 0.98 m in length. This broadened to 0.32 m at the south-east end. The edges of Thompson's excavation of the feature were formed by an intermittent deposit of grey

clay deposit lining the edge of the cut, at one point incorporating a flat stone placed on edge (484). This material was almost certainly used to bed the beam securely into place after its installation. The cut defined below this (473) was straight sided and flat-bottomed (Fig 83a). It was 0.24 m wide, widening to 0.50 m at the south-east end, and was 0.27 m deep. The residual fill of the slot after the removal of Thompson's fill (482) comprised a loose sand bedding for the timber beam (472). The beam above this (471) was replaced by dark grey silty sand, and measured 0.18 m wide and 0.09 m thick (Figs 83c, d; 84a, b). At a distance of 0.22 m inside the point at which the slot was cut by the side-wall of the later *vomitorium* wall, an upright member was recorded in section (541). The grey-brown material which replaced the upright (540, 539, 538, 537) included an iron nail (Fig 83e). This frame was carefully excavated in section, and it was clear that the slot had cut through earlier deposits (478, 479) overlain by the upcast from cutting the slot, which was deposited on the north-east side of the cut (474, 475, 476, 477). The base of the slot survived beneath the foundations of the later *vomitorium* side-wall (122) (Fig 83b).

8 Radial timber-frame. The original cut (1203=666) survived for a length of 5.70 m, although the north-west and south-east ends were lost through truncation (Fig 85a). The sides were almost vertical and the base was flat. The cut was 0.54 m wide and 0.18 m deep. The basal fill was a light grey-brown sandy silt (1204). Above this lay the imprint of a base-plate which had been replaced by a dark-grey clay-silt (664) defining a timber 0.22 m × 0.11 m in section (Figs 85c, 86d). At the north-west end of the frame, a section (Fig 85b, 86c) revealed the outer ring-beam (675) preserved in the same way. The base-plates had been packed into place by a grey silty sand deposit (665). The packing around the beam was sealed by the first deposit (1131=677) to be laid around the emplaced timber-frames. These relationships, when recorded in section in 2004 were the first indications of the survival of detailed stratification relating to the construction process. The section, located on the junction between the radial timber-frame and the outer ring-beam, also showed the position of an upright member, possibly a diagonal brace, on this junction (667: disturbed by a later animal burrow 674, 664). Also shown is the material (677, 676, 663, 662, 661, 319) that was packed around the frame following its construction (below). The outer butt-end of the original cut for the radial timber-frame lay 1.48 m beyond the line of the outer ring-beam. 1.20 m inside the outer ring-beam, on the line of the radial, was an amorphous



Fig 84 (a) View from the inner end of the initial cut for radial timber frame 7 (473) following the completion of the removal of the fill of the base-plate impression. At the far end of this view is the section formed by the edge of Thompson's excavation (Fig 83d). (b) Section across radial timber frame 7 and sealing stratigraphy. The base-plate is represented by the dark grey material within the slot.

sub-circular feature (1242, fill=1243) which may have been the base of a timber upright within the slot. Three further uprights were recorded in plan along the line of the slot (1366, 1367, 1368) spaced with centres 0.85 m apart, as measured from (1242). Two of these were recorded in plan by Thompson (1976, fig 3).

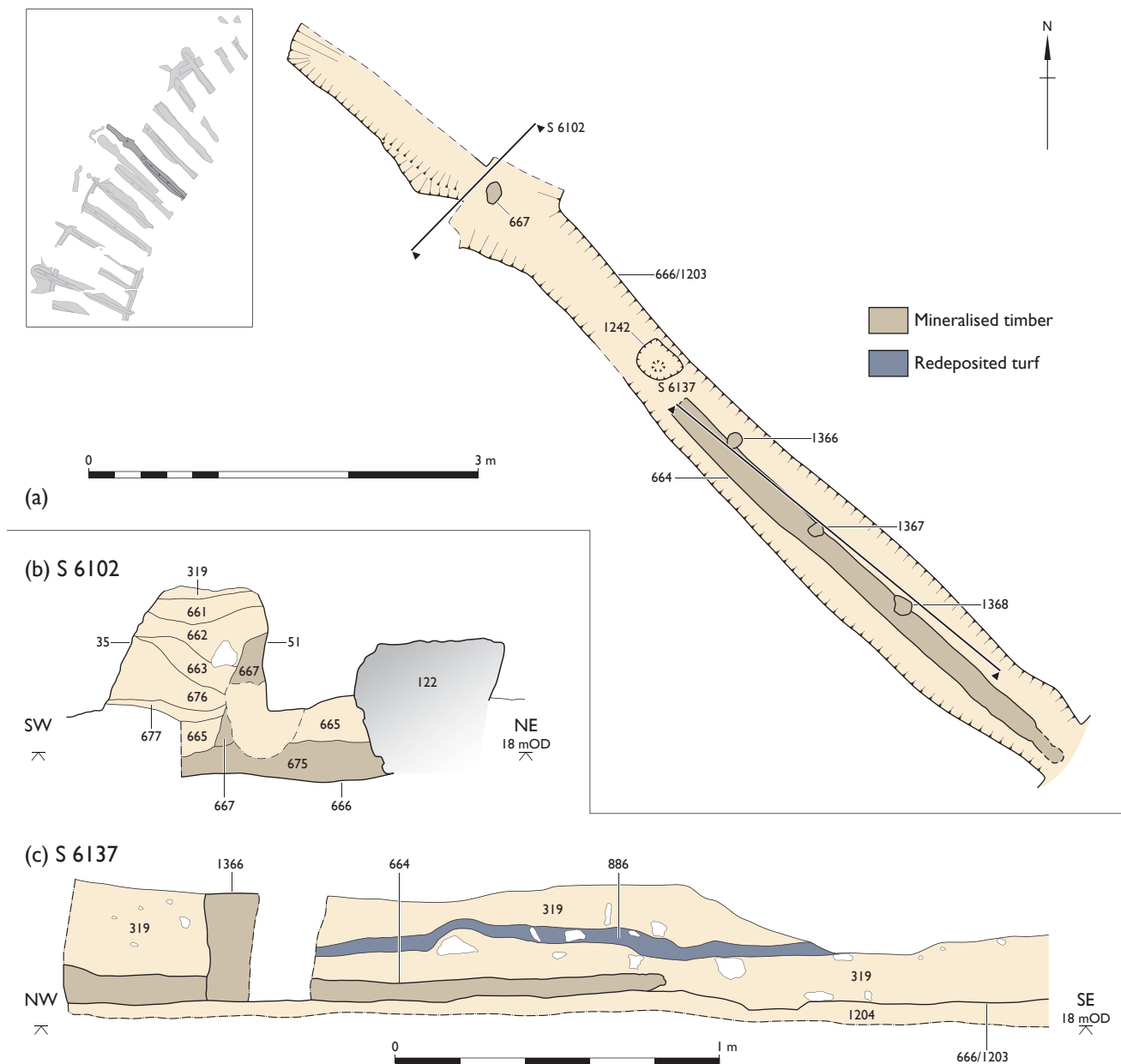


Fig 85 (a) Detail plan of radial timber frame 8. (b) Transverse section S6102 across radial frame 8 at the junction with the outer ring-beam, showing a diagonal brace (667). (c) Longitudinal section S6137 showing upright, base-plate (664) and overlying dump deposits including the layer of redeposited turf (886).

The material packed around the frame was predominantly the red decayed sandstone derived from the excavation of the arena (319), but here it included a deposit of redeposited turf (886) which formed a dump within (319), and contained a coin of Domitian (CO25) dated to AD92–4.

- 9 Slot for a radial timber-frame (Fig 87). The initial cut (1150) was 6.50 m long, and was truncated at the inner end. The outer terminus was a rounded butt-end. The slot had near-vertical sides and a flat base. It was 0.38 m broad and 0.17 m deep.

The basal fill was a grey-brown gritty sand (1181), overlain by a deposit of coarse, reddish sand including pieces of decayed sandstone (1151) (Fig 88). The slot was totally sealed by the first deposit to be laid around the timber-frames, but there was no imprint of any timber base-plate. The slot was also anomalous in its spacing. It seems clear that this was an error in construction, and that the slot was never used and was backfilled during construction of the timber seating.

- 10 Radial timber-frame (Fig 89a). The initial cut (1233)

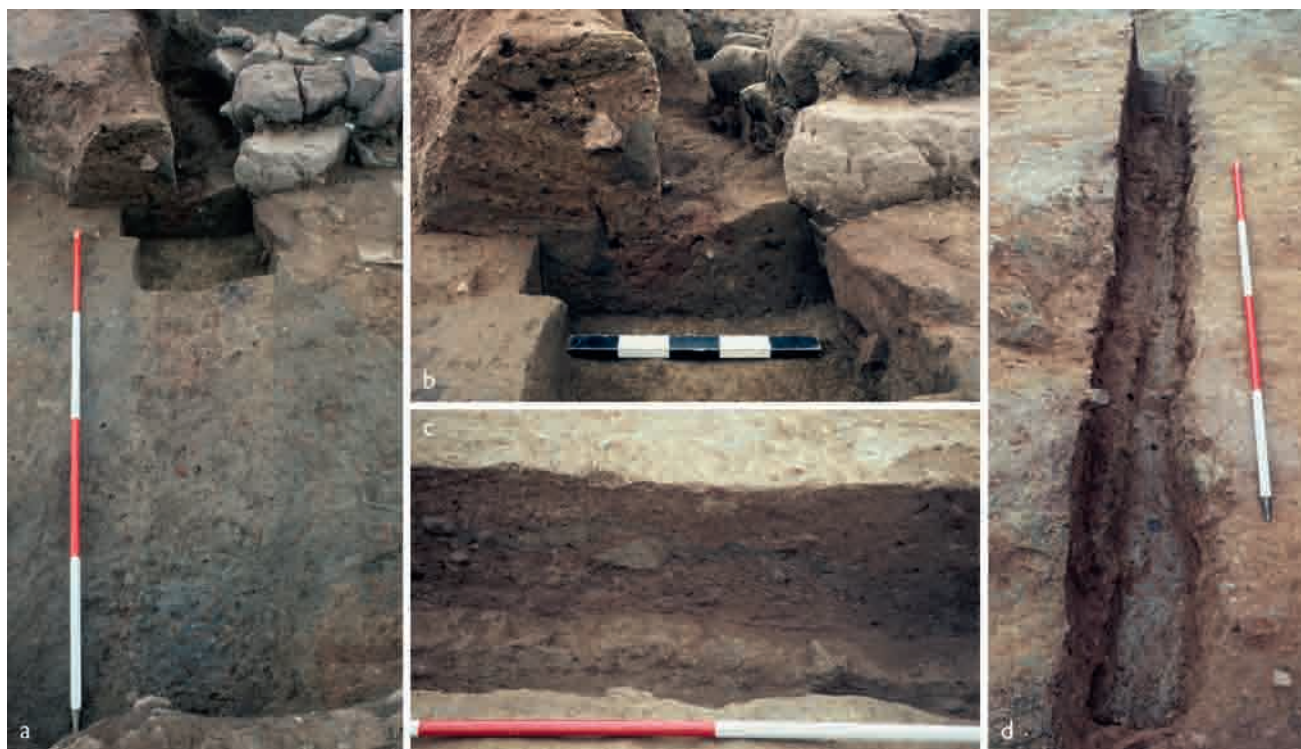


Fig 86 (a) View from the inner end of radial timber frame 8 showing the fill (665) of the initial cut (666) *in situ*. This has been sectioned at the far end. (b) Section across radial timber frame 8 (Fig 85b). The base-plate has been replaced by an animal burrow, but the brace can clearly be seen. (c) Detail of longitudinal section along showing base-plate (664) and overlying dump deposits. (d) Initial cut for radial timber frame 8 from inner end showing cast of base-plate (664).

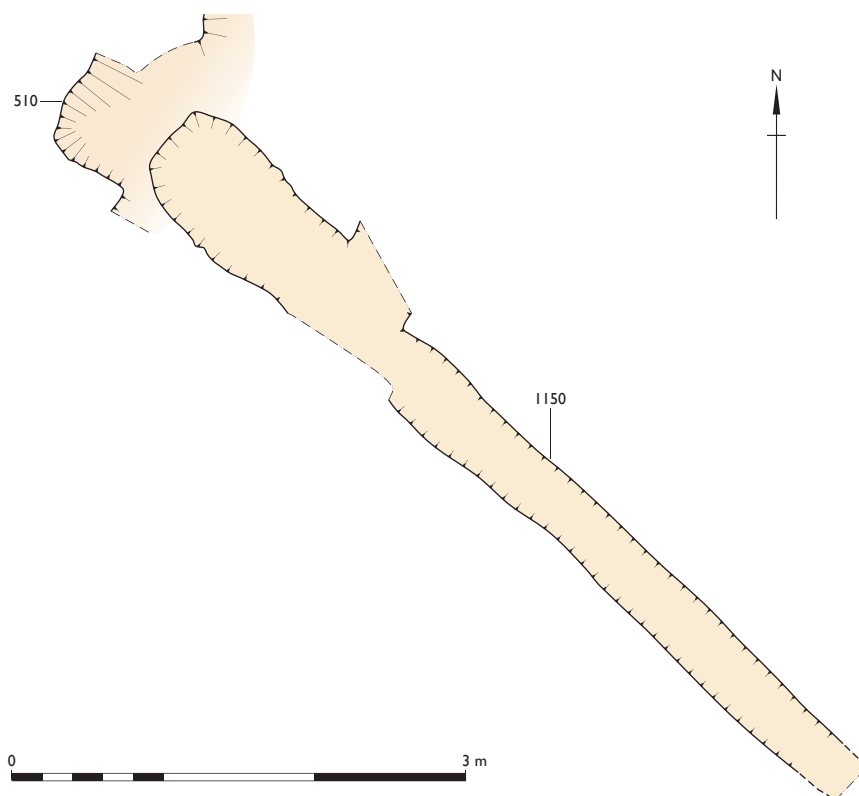
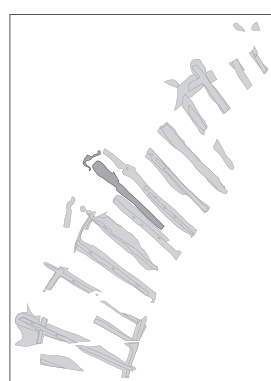


Fig 87 Detail plan of timber slot 9.

survived to a length of 4.90 m. It was a shallow concave trough with merging base and sides, measuring 0.65 m wide and 0.10 m deep. The fill of the slot was a light brown silty sand (1234), which may have acted as a bedding or levelling deposit for a timber beam (Fig 90a). The northern side of the slot fill was sealed by deposit (1131), and the timber placed in the south side of the slot marked the edge of this consistent spread deposit.

On the south-western side of the broad cut, a narrow slot (1021) (Fig 90b) surviving to a length



Fig 88 Section through initial cut for timber slot 9.

of 4.94 m represented the line of the original base-plate which was 0.32 m wide and 0.15 m in depth. A lens of fine red sand (1020) underlay a grey-brown silty sand (1069=985) that had replaced the base-plate. Three upright elements were defined in section (Fig 95b), the imprints of which were preserved in the coarse red sand and crushed sandstone (319) which was laid around the base-plates and uprights. The upright members were irregularly spaced. Two of them were recorded in plan by Thompson (1976, fig 3). The outermost upright (914) measured 0.15×0.5 m and survived to a depth of 0.17 m. The second upright (916) lay 0.60 m inside (914). It measured 0.17×0.7 m and survived 0.23 m deep. The final upright member in this frame (918) was 1.34 m inside (916). It was 0.16×0.6 m in plan and survived to 0.25 m deep. The uprights appeared as rectangular features in plan, and the fills comprised very dark orange-brown stony sand. It seems likely that the posts decayed *in situ*. Radial timber-frame. The initial cut (1027=1210) was 5.62 m in surviving length, ranged from 0.30 m wide at the inner end to 0.92 m at the outer, and was 0.17 m deep. The south side sloped gently, the northern was nearly vertical, and the base was flat. The terrace cut (510) was cut back further than its normal line in order to accommodate the long base-plate (Fig 91a).

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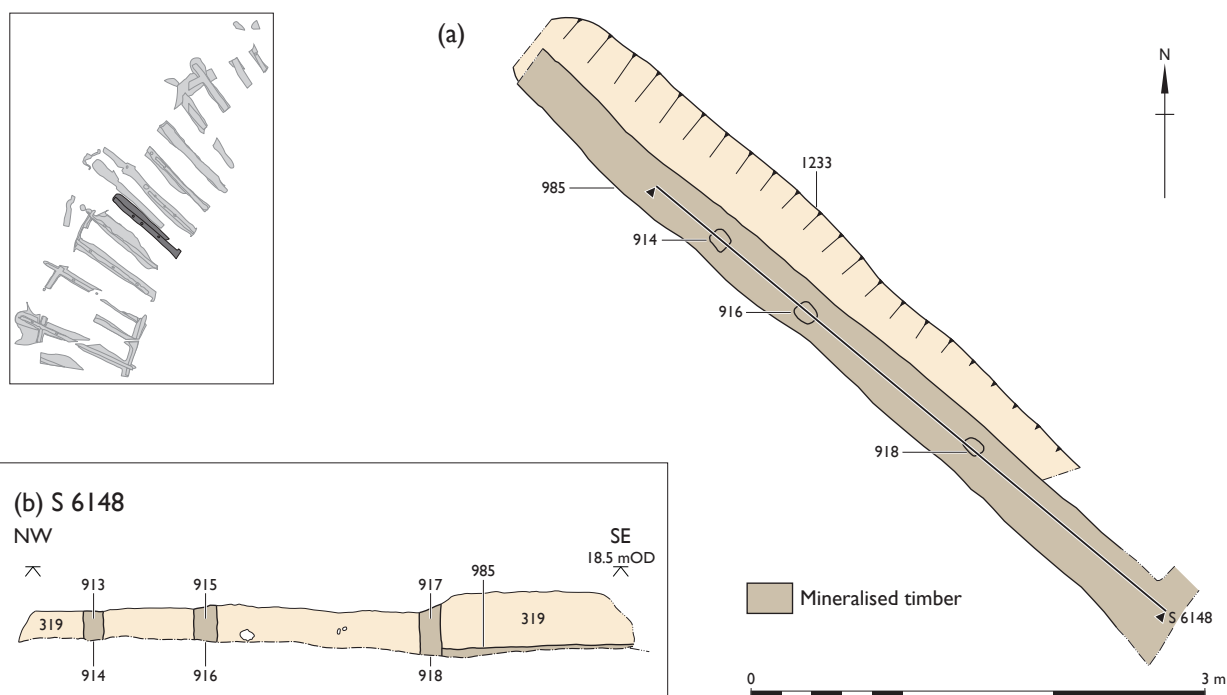


Fig 89 (a) Detail plan of radial timber frame 10. (b) Longitudinal section S6148 showing the frame in elevation, consisting of base-plate (985) and three uprights (914, 916, 918).



Fig 90 (a) Section of the initial cut for radial timber frame 10. (b) Impression of base plate (1021) in the initial cut following the removal of the timber cast.

The surviving traces of mineral-replaced timber casts in this slot afforded some of the best evidence recovered for the structure of the timber seating framework. A timber base-plate had been placed in the initial cut without a bedding deposit. This timber was preserved partly as a dark grey sandy silt (923=965), and at the inner end was replaced by red sand which had filled the slot when the beam had rotted. The beam was 4.10 m in surviving length, was 0.17 m deep and 0.23 m broad. The initial cut was backfilled around the emplaced timber beam with a compacted packing of dark, grey-brown clay-silt containing flecks of charcoal and CBM as well as pebbles and small pieces of sandstone (1058) (Fig 91c). The intersection of the radial base-plate with the outer ring-beam (636) was preserved. The radial extended 0.81 m beyond the line of the ring-beam.

The uprights, two of which were recorded in plan by Thompson (1976, fig 3), and the braces of the frame were excavated and recorded in section (Fig 91d, 92a). At a distance of 1.90 m inside the outer end of the beam and 1.10 m inside the ring-beam was a timber upright, preserved as a cast (924) comprising compact dark-grey clay-silt surviving 0.35 m high, and measuring 0.20×0.12 m in section. At the base of the upright, at its intersection with the base-plate was an iron nail. Although probably originally the attachment

of the upright to the base-plate, it seems that later processes may have moved the nail from its original position. 0.62 m outside upright (924), and intersecting with the join between the radial slot and the outer ring-beam, a diagonal brace was set at approximately 30 degrees to the base-plate and the upright (Fig 92b). This was preserved as a compact dark-grey sandy-silt cast measuring 0.13 m square in plan, and with a surviving length of 0.57 m (922). At the intersection of base-plate (923), outer ring-beam (636) and diagonal brace (922) was an iron nail, used as part of the attachment of the three elements. This again is thought to have been displaced by subsequent soil processes. The base of the diagonal was offset 0.12 m from the base of the upright, and it was apparent that the brace and upright could not have been jointed (Fig 92c). It was concluded that the timbers must have been set flush, face to face, and nailed (p 153). There was a little evidence that the brace and the base-plate were further joined by means of a timber peg, attested by a lighter area in the timber cast, with a straight, slanting, lower edge (Fig 92d).

1.60 m inside upright (924) (1.80 m centre-to-centre) was the cast in dark-grey, compact clay-silt of a second upright (926), surviving to a height of 0.22 m, and measuring 0.16×0.08 m in section. It was decided to excavate the terrace fill dumped

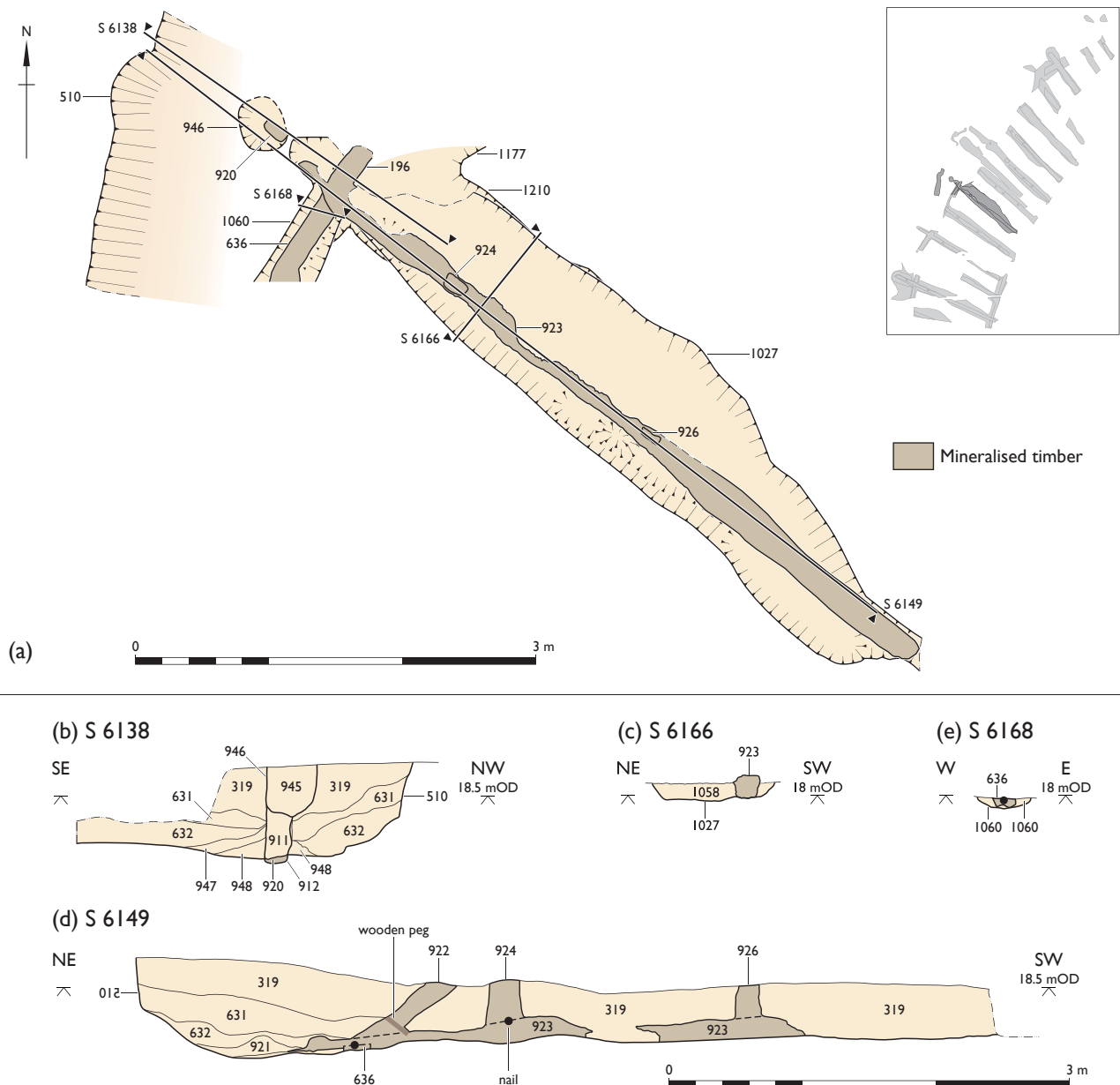


Fig 91 (a) Detail plan of radial timber frame 11. (b) Detail section S6138 of upright (920) and associated deposits. (c) Section S6166 across the initial cut (1027) showing position of the base-plate in the slot. (d) Longitudinal section S6149, showing the elements of the timber frame; base-plate, two uprights and diagonal brace. The positions of iron nails are also shown. (e) Section S6168 through the outer ring-beam (1060) showing nail *in situ*.

around the timbers in order to examine the frame in three-dimensions. Although the brace could not be supported, this was successful for the base-plate and uprights (Fig 92e).

At a distance of 0.81 m outside the outer ring-beam was a further upright (920). The dark grey clay-silt cast of the upright (911, 912) was 0.18 m square in section and survived to a height of 0.40 m. It was laid on a thin deposit of clay (962). The post had clearly been deliberately removed

at the top by the excavation of an extraction pit (946, fill = 945). Deposits (947, 948) recorded in section around the base of the upright appear to have been upcast from the excavation of the initial cuts for the frames (Fig 91b, 92d). Despite the colour and appearance of the deposit (947), this did not appear to be the cast of a low-raking timber brace supporting (920).

Radial timber-frame (Fig 93a). The initial cut (1026=1211), truncated by later disturbance at the



Fig 92 (a) Radial timber frame 11 under excavation, showing the base-plate, two uprights, and outer diagonal brace. (b) Detail of upright (924), brace (922), and base-plate (923) (c) Detail of upright (924) and brace (922) from above, showing that they were out of alignment and could not, therefore, have been jointed together. (d) Upright (920) set in base-plate. (e) Uprights (924) and (926) with base-plate (923). The material around the casts of the timbers has been removed in order to get a three dimensional record of the frame elements. The brace could not be supported.

outer end, measured 5.95 m long, between 0.42 and 0.73 m wide and 0.22 m deep (Fig 94b). A shallow (0.04 m) primary fill of silty sand (1050) may have functioned as a bedding deposit for a timber base-plate, which was represented by a cast in dark grey-brown silty sand (978) (Fig 94b). It measured 5.95 m long, 0.24 m broad and 0.12 m thick. The packing material around the timber (1049) was a light grey-brown sandy silt (Fig 94b). The base-plate, and upright and diagonal elements of the superstructure of the seating framework were preserved by the red sandy dump deposit (319), and were recorded in section (Figs 93c, 94c, d).

1.10 m inside the intersection of the outer end of the sill-beam with the outer ring-beam (636) was the cast of an upright timber (932) formed by dark brown compact sandy-silt. The upright survived to a height of 0.34 m, and measured 0.19×0.08 m in plan. Outside the upright was the cast of a diagonal brace (930) surviving to 0.50 m long and measuring 0.12×0.18 m. An iron nail survived at the base of the brace at the point where it would have met the radial beam. Although this junction did not survive, if the brace was projected it would have met the radial beam at its junction with the outer ring-beam, as was the case in radial timber-frame 11.

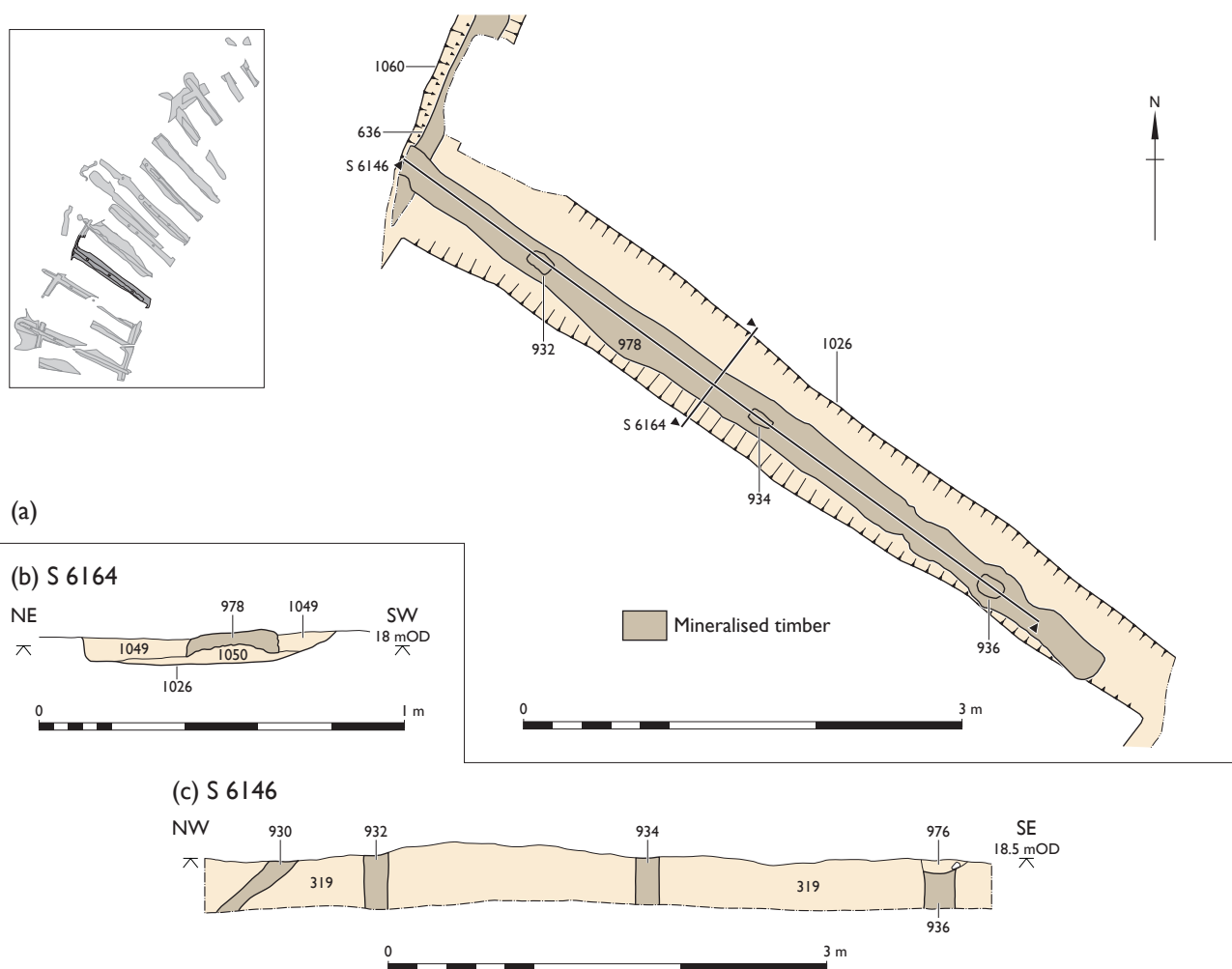


Fig 93 (a) Detail plan of radial timber frame 12. (b) Section S6164 across the initial cut (1026) showing position of the base-plate (978) in the slot. (c) Longitudinal section S6146 showing the frame, including three uprights and a diagonal brace.



Fig 94 (a) Initial cut for radial timber frame 12 (1026) viewed from the outer end. (b) View from inner end showing the cast of the base-plate (978) within the initial cut (1026). (c) Section view of the three uprights and diagonal brace of radial timber frame 12. (d) Detail of upright (930) and diagonal brace (932).

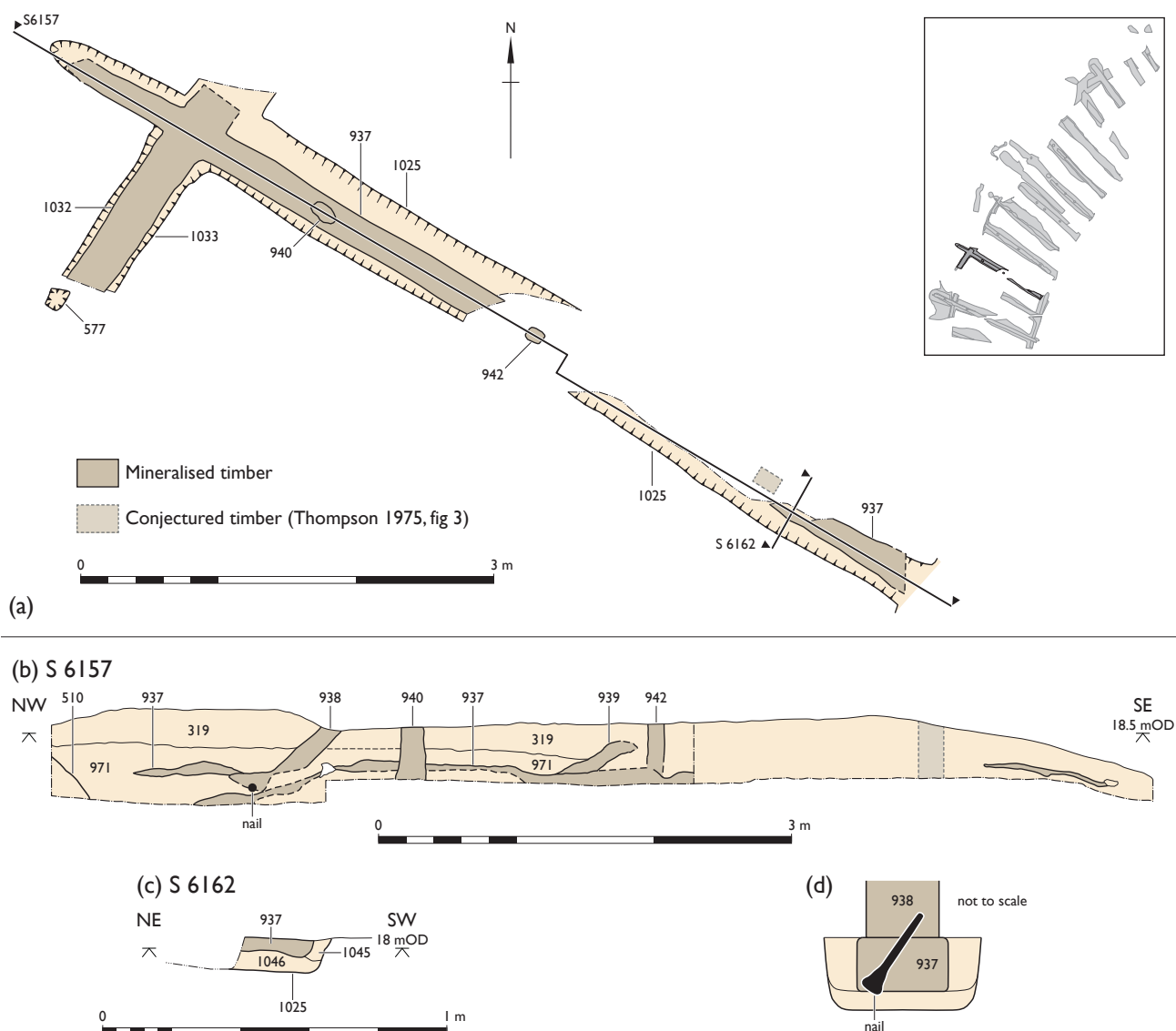


Fig 95 (a) Detail plan of radial timber frame 13. (b) Longitudinal section S6157 showing the elements of the timber frame; base-plate, two uprights and two diagonal braces. (c) Section S6162 through the initial cut of (1025), showing the bedding layer (1046), base-plate (937) and packing (1045). (d) Sketch section to show position of iron nail fastening brace (938) to base-plate (937) and driven in from beneath the base-plate.

Inside the outer upright (932), at a distance of 1.80 m (centre-to-centre) was a second upright 0.34 m high, and measuring 0.15×0.08 m in plan (934). An iron nail was found at the junction between the upright and the radial beam (978). At a distance of a further 1.80 m (centre-to-centre) inside upright (934) was a third upright (936) measuring 0.42 m high and 0.17×0.30 m in plan. This was a cut to withdraw the timber rather than a cast of an original timber, and was filled with two successive sandy silt deposits (935, 976). An iron nail was found at the base of the upright and was probably originally used to nail the upright to

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the base-plate. All three uprights were recorded in plan by Thompson (1976, fig 3).

Radial timber-frame. Though interrupted, this was one of the few slots preserved to its full original length. The initial cut (1025) was 7.35 m long, 0.45 m wide and 0.13 m deep. It extended 0.98 m beyond the outer ring-beam (1032), and ended just short of the base of the terrace cut for the grillage (510) (Figs 95a, 96a). At the arena end of the slot the relationship with the inner ring-beam (944) had been cut away by later activity (Fig 98). The primary fill was a yellow-brown sand (1046), which acted as the bedding deposit for the

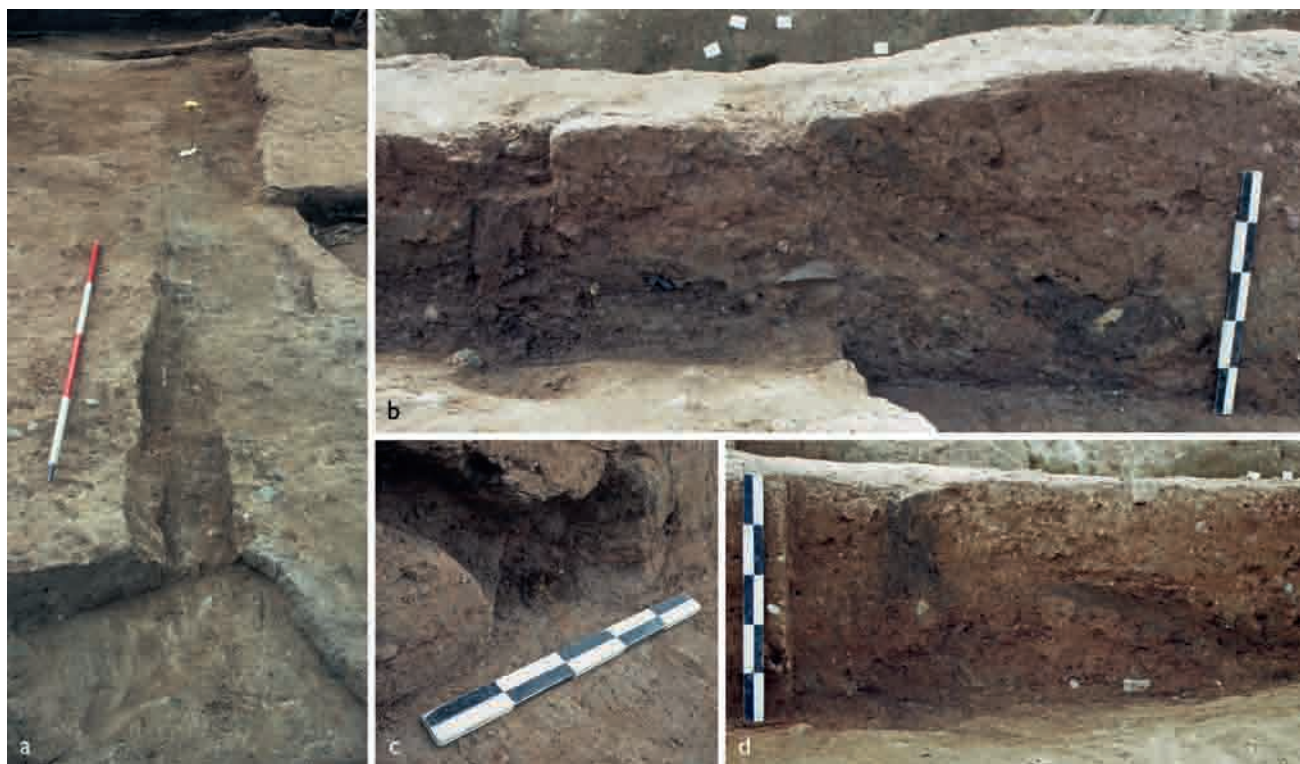


Fig 96 (a) The initial cut for radial timber frame 13 (1025) viewed from the outer end. (b) Detail of upright (940), brace (938), and base-plate (937). (c) Detail of *in situ* iron nail fastening brace (938) to base-plate (937). Point is uppermost as it had been driven in from beneath the base-plate. (d) Detail of upright (942), brace (939), and base-plate (937).

base-plate of the frame (Fig 95c). This (937) was preserved as a compact dark grey clay-silt. It was 0.21 m broad and 0.08 m thick. The secondary fill of the cut (1045) consisted of a red-brown silty clay which was originally used as packing around the base-plate.

The base-plate, upright and diagonal elements of the superstructure of the seating framework were preserved by the red sandy dump deposit (319), and an underlying dumped deposit (971) was recorded in section (Fig 95b). Between the radial cuts (1024) and (1025) were dumped deposits probably deriving from the excavation of the timber slots (789, 1031) 1.10 m inside the intersection of the outer end of the sill-beam with the outer ring-beam (1032) was the cast of an upright timber (940) 0.38 m in surviving height, and 0.18×0.12 m in section, and comprising grey-brown clay-silt. Outside this upright was the cast of a diagonal brace (938) some 0.74 m in length and at least 0.13×0.08 m in section. It was placed at approximately 40 degrees to the base-plate (Fig 95b). In plan the diagonal appears to have been slightly out of line, suggesting that the diagonal was fastened to the face of the upright, possibly by nailing. At the junction between the diagonal and the base-plate (937) was an iron

nail (Fig 96c). This seems to have been in its original position and was driven in from beneath the base-plate (Fig 95d), demonstrating that the frames were pre-fabricated before being erected in the slots.

At a distance of 1.80 m (centre-to-centre) inside (940) was a second upright defined as a cast of a beam (942) comprising dark grey sandy silt, surviving to a height of 0.30 m, and measuring 0.14×0.08 m in plan. Unlike other frames, this upright was also provided with a supporting diagonal brace (939) at around 40 degrees to the base-plate (Fig 96d). The diagonal timber was greater than 0.10×0.09 m in scantling. Thompson's plan (1976, fig 3) suggests that a third upright originally existed inside (942). If so it would be analogous to the upright (936) in radial timber-frame 12.

The initial deposit sealing the base-plate was a reddish-grey clay deposit (971) that appeared in plan to have been upcast from the excavation of the cut for radial timber-frame 12. This was one of several indications that work on the construction of the frames proceeded in a clockwise direction from south-west to north-east (*cf* radial timber-frame 7, where spoil from the cut of the slot was deposited on the north-east side of the slot).

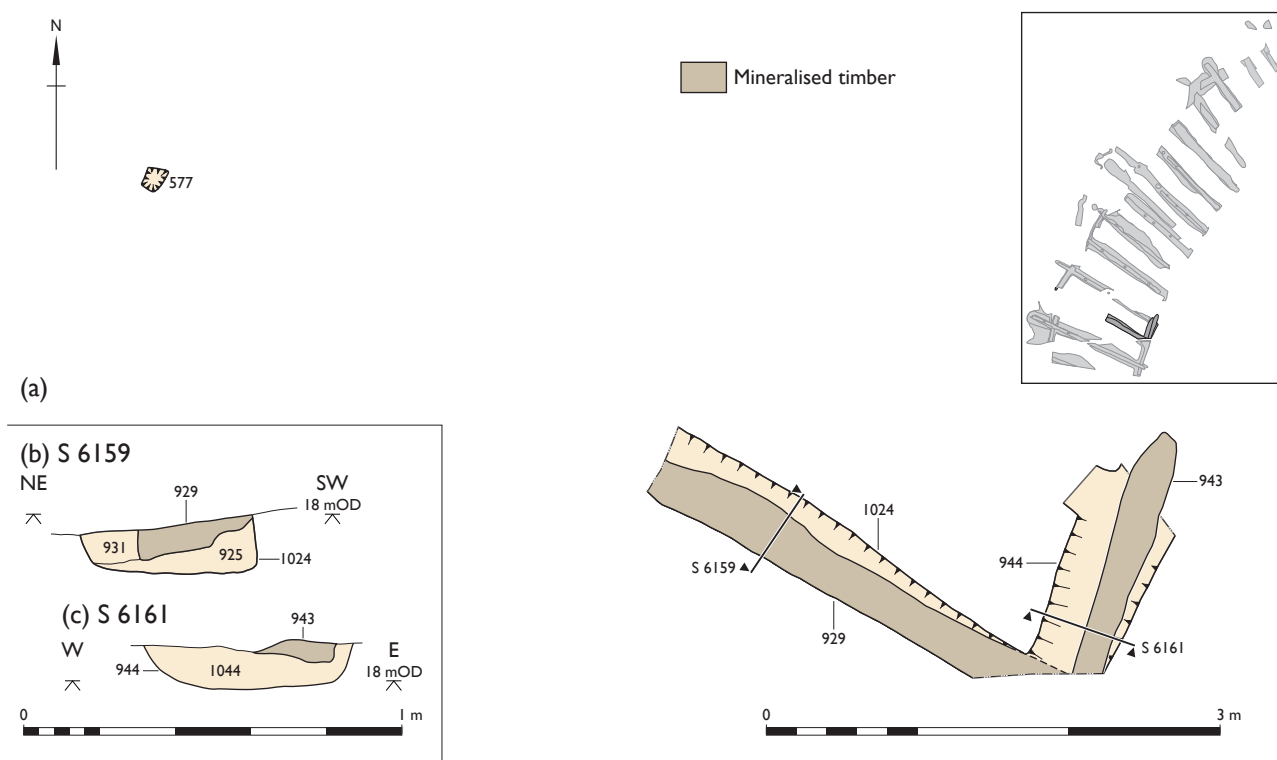


Fig 97 (a) Detail plan of radial timber frame 14. (b) Section S6159 across the initial cut (1024), showing the bedding layer (925), the packing (931) and the sand-replaced timber (929). (c) Section S6161 through base plate (943) and initial cut of the inner ring-beam (944).

- 14 Radial timber-frame. The initial cut (1024) was truncated to a length of only 2.70 m (Figs 97, 98a). It was 0.40 m broad and 0.20 m deep. The primary fill in this slot (925) was a grey-brown sand, probably placed as a bedding deposit for a timber base-plate. The rotted base-plate was replaced by red-brown silty sand (929) and this represented a timber 0.28 m wide and 0.09 m thick. A secondary fill which lay between the edge of the cut and the north side of the fill representing the decayed beam was a mid grey-brown sandy clay (931), probably placed as a packing deposit to firm the base-plate into position (Figs 97b, 98b).

Despite the heavy truncation of this frame, the cast of an upright (577) was found in the section of a later pit (Fig 98d). This cast, in which three iron nails were found, was an upright 0.10 m × 0.15 m in plan and surviving to a height of 0.80 m, and was located at the point where the radial base-plate would have joined the outer ring-beam.

- 15 Radial timber-frame. This is the only example to retain the full original length of the timber-slot, including continuations beyond the lines of both the outer and inner ring-beams (Fig 99a). It is also the only place where the detailed relationship between the outer ring-beam and a radial timber-frame could be established.

The initial cut (523=1136) measured 8.60 m in length, projecting 0.60 m beyond the inner ring-beam and 1.60 m beyond the outer ring-beam. It seems that the radial beam was unusually long, as the terrace cut (510) was cut back to accommodate its outer end. The primary fill, probably to bed the base-plate in, was a brown silty sand (1199). The main body of the fill, which packed the base-plate into place (522=1127) was sealed by grey-brown sandy clay deposit (1138=1239) in the surface of which the imprint of the beam was defined. Over most of its length the beam was replaced by a red-brown sandy silt (1121) (Fig 100), but at the outer end a cast survived preserving a base-plate with dimensions 0.22 × 0.08 m (1119=516=1155=1161) (Figs 99c, 100c).

At the outer end of the slot, upright and diagonal members were recorded in section, preserved in overlying dump deposit (319). An upright timber (1022) was located 0.70 m outside the line of the outer ring-beam (Fig 99b, 100d–f). This measured 0.16 × 0.09 m in plan and survived to a height of 0.33 m. An iron nail was hammered into the back of the upright (Fig 100f), but it is not apparent what this fastened to the upright. A broadening at the base of the upright to a width of 0.26 m may reflect the existence of an additional



Fig 98 (a) The initial cuts for radial timber frames 14 (1024: left) and 13 (1025: right) viewed from the inner end, and the inner ring beam (944). (b) Radial timber frame 14 as defined before excavation, showing the grey packing (931) for the base plate which was replaced by red sand (929). (c) Cast of upright (556) as defined in the section of a later pit. (d) Iron nails driven into inner ring-beam (944).

timber support, the nature of which cannot be determined. At the junction between the radial slot and the outer ring-beam a diagonal brace (990, 991) supported a second upright (989) (Fig 99d, 100g). This was the highest surviving upright on the site at 400 mm. It measured 0.12×0.11 m in plan, and was set 1.20 m inside the brace. The junction between the upright and brace here was

the only place where such a joint was preserved. The two members were not jointed. The timbers were placed face-to-face and nailed with an iron nail, which remained *in-situ* (Fig 100g–j).

16

Radial timber beam. Only a small part of this feature survived. The initial cut (1137) was 0.6 m wide and 0.05 m deep, having been heavily truncated by Newstead's later excavation trench

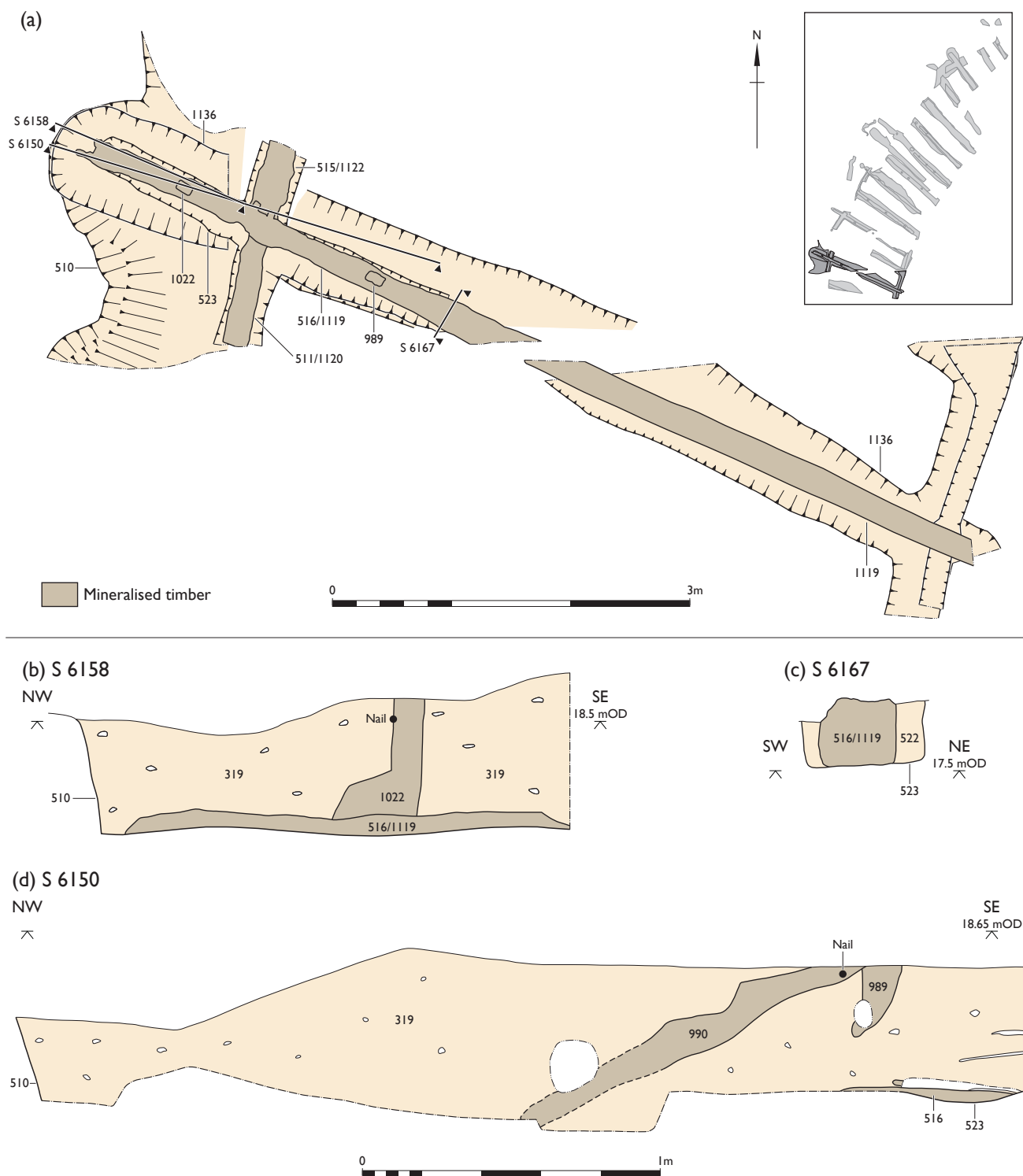


Fig 99 (a) Detail plan of radial timber frame 15. (b) Section S6158 to show upright (1022) and base-plate (516=1119) and relationship with terrace cut (510). (c) Section S6167 showing the initial cut (523), the cast of the base-plate (516) and packing (522). (d) Longitudinal section to show upright (989) and brace (990). The nail at the junction between these two members was recorded at the top of the surviving stratigraphy of the timber framework.

Fig 100 (opposite page) (a) Outer end of base plate (516=1119) to show the cut back in terrace cut (510) accommodating the extra long base plate. Also visible is the cross-halving joint with outer ring beam (515=1122). (b) Initial cut for radial timber frame 15 viewed from inner end, showing red sand deposit replacing the inner end of the timber in the area truncated by Newstead's excavation. The diagonal cut between the two ranging rods is the edge of Newstead's trench. (c) Section showing the base-plate cast (516=1119) and packing. (d) Section to show upright (1022) and base-plate (516=1119) in relationship with terrace cut (510) and the outer ring beam



(515=1122). (e) The base-plate of radial timber frame 15 (516=1119) with upright (1022) lying behind the line of the outer ring beam (515=1122) which is visible in the bottom right of picture. (f) Upright (1022) following excavation of the surrounding dumps (319) showing base-plate (516=1119) and *in situ* iron nail in back of upright. (g) Section showing upright (989) and brace (990) above base-plate (1119=516) and showing nailed joint at the top of the section. The brace rises from the outer ring beam (1122=515). This is cut by the diagonal cut in the foreground, which is the edge of Newstead's excavation trench. (h) Detail of the junction of upright (989) and brace (990) showing the nailed joint. (i) Upright (989) and brace (990) in plan, to show that they were not jointed, and the *in situ* nail that fastened them together. (k) Detail of wedges in joint between radial base-plate (516=1119) and the outer ring beam (515=1212).

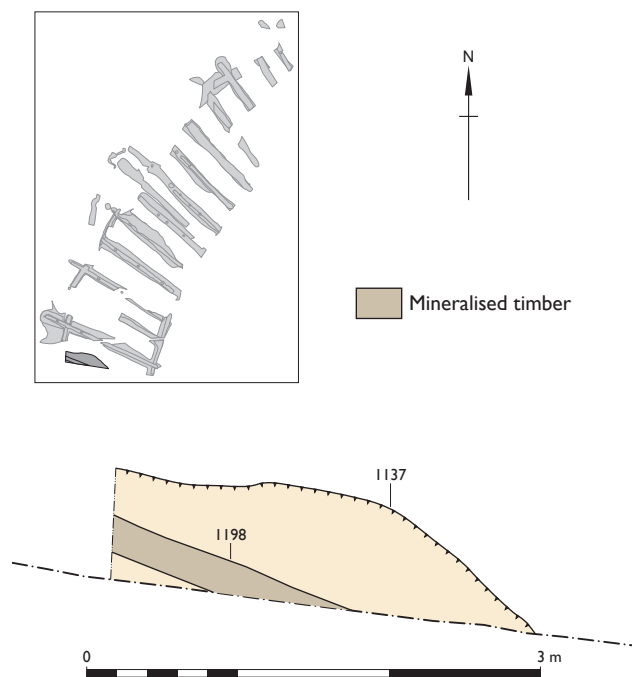


Fig 101 Detail plan of radial timber frame 16.

(Fig 101). The fill of the trench (1200) was a firm red-brown silty sand which acted as a bedding and packing to a timber beam which had been replaced by a dark grey-brown silty clay (1186=1198).

Nails and mineral preserved timber from the timber framing

By Quita Mould, Jacqui Watson, Gill Campbell and Karla Graham

Iron nails were found in 26 timber frame contexts. Of these 15 were sufficiently complete to provide an accurate guide to the size of nail used (Table 11). An 'all-purpose' nail (type 1b Manning 1985, 134-5, 32) had been used, no more than 120 mm long with a flat head around 28 mm wide. Even including iron incrustation, these fall well below the larger range of 'unspecialised' nails (type 1a Manning 1985, 134-5), but are at the larger end of the 'medium-sized' nail likely to have been in the general 'tool box' which are regularly found in quantity at Romano-British sites.

Some of these nails retained mineral-preserved remains of timber. Analysis of the grain pattern shows that the framing was constructed of beech and ash timber, both of which were available locally, though beech was somewhat more scarce (Godwin 1975, 273, 311). In one case (Fig 95d) the angle of the grain demonstrated that the base-plate timber was sawn to a rectangular section, not split, suggesting that sawn timber was generally used in construction.

Deposits placed around the timber-framework

When the timber-framework was complete, it was secured in place by building up redeposited material over the base-plates and around the bases of the frames. The imprints of

base-plates, uprights and braces were preserved in these sealing deposits, which survived up to a height of 1.15 m.

At the bottom of the sequence, from the north entrance around to radial timber-frame 10, the basal dump deposit (1131=667=1184), identified and excavated in 2006 acted as a valuable stratigraphic marker, in that it consistently sealed the initial cuts for the timber-frames, and the packing material laid around the base-plates. This meant that the slots previously defined apparently as cutting the surface of this material were left by the decay of the base-plates, whose dimensions could thus be recovered. This material comprised a grey-red silty sand characteristic of redeposited material derived from the surface of the natural sandstone. The vast majority of the materials dumped around the timber-frames were redeposited natural sands and clays. It is thought likely that these were produced from the arena, which must therefore have been deepened as part of the Phase 6 alterations to Amphitheatre 1. Above the basal deposit were a series of dumps which seem to have been placed in order to hold down and secure the individual base-plates before the major phase of dumping took place. These deposits, particularly noticeable around radial timber-frames 8 (927) and 9 (928, 1079), and recorded in section over the outer ring-beam (612, 613, 611; Fig 74, Section S609) largely comprised grey-brown clay, possibly selected for the purpose, interleaved with red sandy material.

After this material was placed over the base-plates, a general dumping took place, backfilling the whole of the terrace cut. The lower layers were mixed, comprising grey, buff, yellow and orange silty clays with a mixture of sandstone. The upper deposits were very red stony sand. The fact that the lower layers of these dumps, as well as the material placed over the base-plates, were, though mixed, very like the primary seating bank in composition, might suggest that they were the same material redeposited. This would solve the question of where the seating bank went when it was cut away. Given that the intention was to install the timber-frame and then re-instate the bank, the logical way of doing this would have been to dump the spoil from removing the seating bank into the arena, and then to re-use it before deepening the arena. The upper layers (319=469) of red, stony sand derive from the natural layers immediately above the sandstone bedrock, won from the arena when it was deepened.

Other than the first deposits along the base-plates, the dumps were not laid in a structured manner, and for this reason any plan showing them would be entirely random. They are shown in a number of sections, however. In Figs 74, 91b, d, the lower two dumps (631 and 632) comprise a grey clay-sand and light brown silty sand, beneath the stony red sand (319). Figs 83d, e show a similar pattern, with a light greyish-yellow compact clay-sand (582, 470) below the red sandy spread (here, 468, 469), and in Fig 85b, several layers of silty and sandy clay (661, 662, 663, 676, 677) ranging from dull orange to light yellowish-grey in colour underlay stony red sand (319). Above the base-

Table 11 Dimensions of complete nails, and survival of mineral-preserved wood from the timber framing in Area A.

SF No	Context	Shank length mm	Head width mm	Timber frame No	Mineral preserved wood
8744.01	515	105	18 (broken)	Outer ring	
7672.01	536	87		7	
7533.01	577	77	20	14	
7533.01	577	70	? (broken)	14	
7533.01	577	84 (broken)		14	
8387.01	667	78 (tip broken)	27	8	
8391.01	930	71 (tip broken)	28	12	
8948.02	930	90 (broken)		12	
8394.01	936	110	26	12	
8328.01	938	70	28	13	<i>Fraxinus</i> sp (ash)?
8493.01	943	68 (broken)	20	Inner ring	<i>Fagus</i> sp (beech)
8473.01	978			12	<i>Fagus</i> sp (beech)?
8398.01	991			15	<i>Fraxinus</i> sp (ash)
8472.01	1022	118	28	15	
9728.02	1121	96 (broken)		15	<i>Fagus</i> sp (beech)?
9627.01	1127	76	20	15	<i>Fagus</i> sp (beech)
9628.01	1127	51 (broken)	25	15	<i>Fagus</i> sp (beech)

plate of radial timber-frame 8 a layer of redeposited turf (886) separated elements of (319) (Figs 85c, 86c), and this contained a Domitianic coin dated AD 92–4 (CO 25)

The red sand (319=469) was a consistent deposit over the whole area within the terrace cut, except where Thompson and Newstead had excavated it away. A very truncated post-hole containing an iron object was cut into the top of this deposit (846, fill=845). It is possible that this represents a repair of the timber-framework, but its isolation makes interpretation difficult. At the same level as that from which this was cut was a small deposit of charcoal-rich material containing burnt bone.

The edge of the terrace cut (510) was sealed by further clean, redeposited material. These deposits (589=842, 818, 823, 585–587, 588=318, 317, 624, 834, 849, 826, 842, 843, 816, 793, 794, 780, 781, 815) sealed both (319) and the upper surviving layers of the primary seating bank, confirming that this bank was lowered to its excavated level when the terrace was cut away (Fig 74). They comprised yellow and brown clay bands between and among deposits of red stony sand. All can be interpreted with (319) as deposits of naturally occurring material redeposited around the timber-frame, having been excavated from the arena.

To the south-west of Area A, during the build-up of these deposits, a repair was carried out to the inner face of the outer wall of the amphitheatre. This involved the cutting of a construction trench (777) into the accumulated dumps, and the re-facing of this section of wall (800). This was identified by the fact that its construction trench cut through deposits overlying the lower courses of the wall. The repair was bonded with blue-grey clay in contrast with the red-brown clay bonding of the primary build (Fig 102).

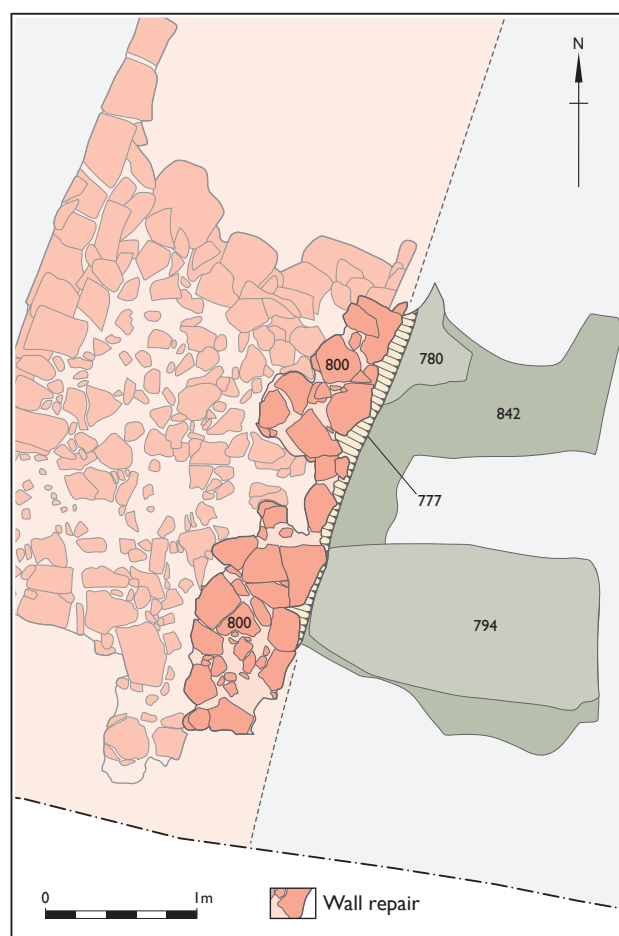


Fig 102 Detail plan of repair to the inner face of the inner wall of Amphitheatre 1 (construction trench 777, refacing 800).

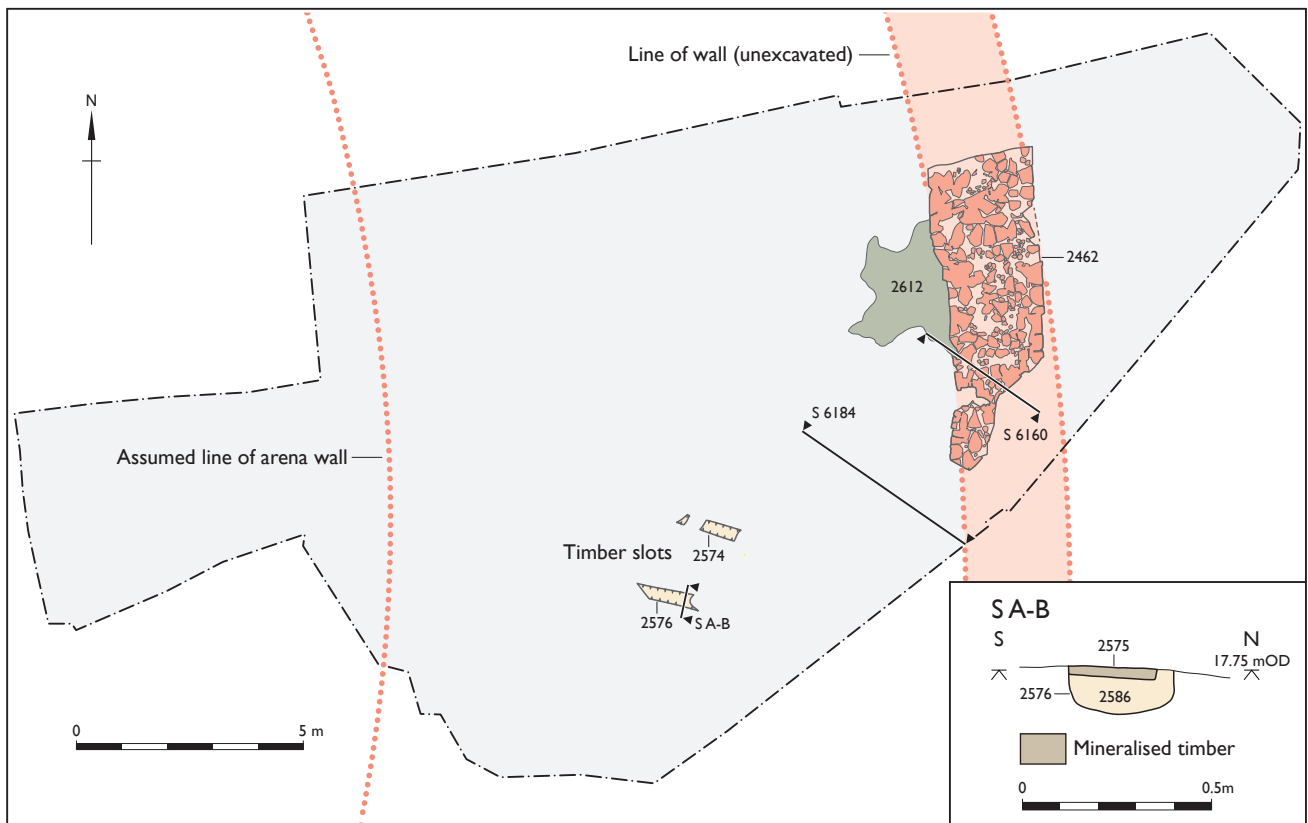


Fig 103 Plan of features of Site Phase 6, Amphitheatre 1b in Area B.

Area B

The results from Area B were complementary to those from Area A. Some evidence for the timber-framed structure survived. In Area A, the surviving seating bank comprised material won from the deepening of the arena. In Area B the deeper survival meant that the make-up of upper seating bank deposits could be determined.

The timber-framed seating structure

Within the footprint of a post-medieval cellar (see volume 2 of this report) a layer of clean red sand (2590) had been deposited over the pre-Roman soil. This layer of sand was exposed over the entire base of the cellar (an area measuring 5.25×2.65 m) and had lenses/bands of light brown sand within it. Cut into this layer were the truncated remnants of two parallel linear slots (2574) and (2576). The most southerly slot (2574) had a surviving length of 1.4 m, a width of 0.3 m and a surviving depth of 50 mm; the fill was a mottled brown silty sand (2573). Slot (2576) lay parallel and 1.6 m to the north of slot (2574) with a surviving length of 1.18 m, a width of 0.3 m and a surviving depth of 0.11 m. The primary fill of slot (2576) was a reddish brown silty sand (2586) which almost filled the entire slot. Upper fill (2575) was located on the southern side of the slot being 0.24 m wide and only 30 mm thick; this fill was a mottled brown silt-sand containing rare charcoal flecks.

It was thought possible that the upper fill (2575) could indicate the original position of a timber beam (Fig 103).

These truncated slots demonstrated that the timber seating framework extended around the entire circumference of the amphitheatre.

Seating bank deposits

At the end of the 2005 excavation season, a block of the surviving amphitheatre seating bank material between the Phase 17 cellar and Phase 11 robber trench was considered to be too unstable to leave *in-situ* (Fig 60b). It was decided therefore to excavate the block (group context number 2612, Fig 103) stratigraphically rather than risking its collapse during backfilling. Owing to later intrusions in the form of pits and wall foundations the deposits were excavated in two separate blocks (Fig 104, Sections S6160, S6184).

The first block had the following stratigraphic sequence beginning with the earliest deposit: (2514) to (2510), (2515), (2509), (2508) to (2505) and (2502) to (2498). This sequence of deposits varied between sterile coarse sands and artefact-rich dumps including (2513), (2507), (2500), (2499) and (2498). The second block had a similar stratigraphic sequence beginning with the lowest/earliest deposit: (2556), (2555), (2543), (2554), (2553), (2542), (2461), (2551), (2372/2431), (2451) and (2450). Here again

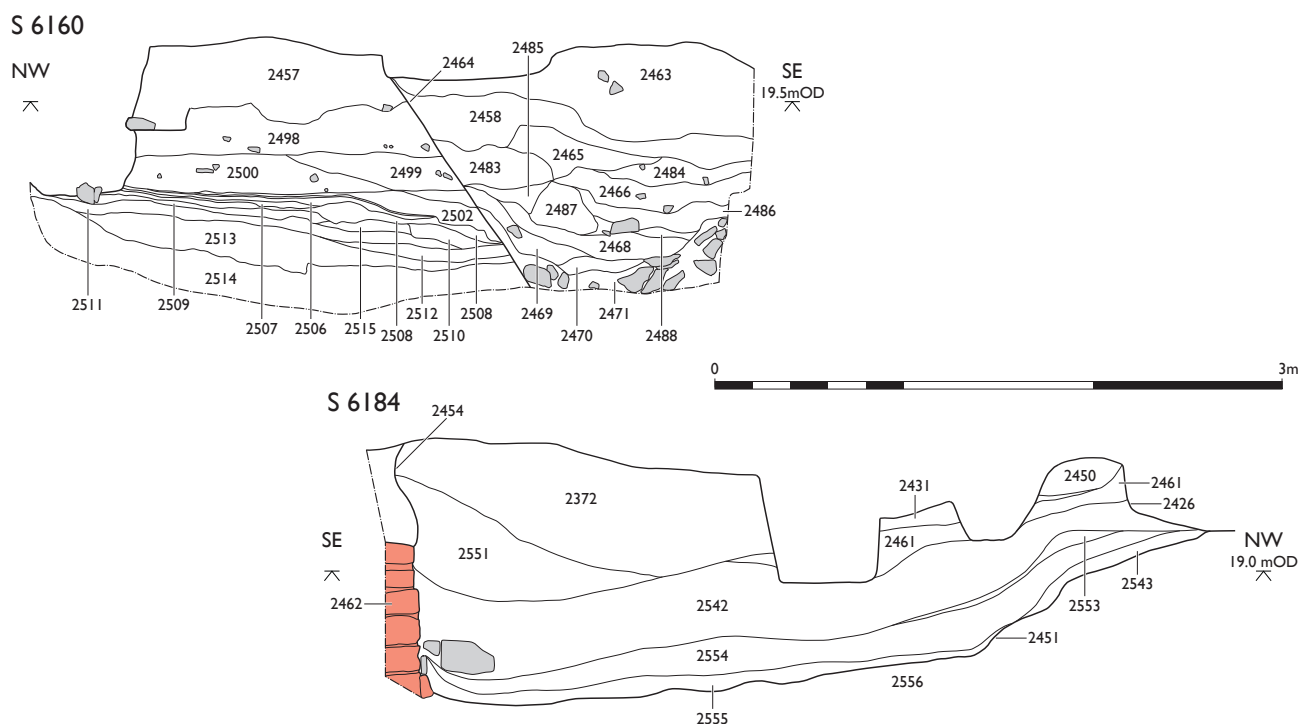


Fig 104 Sections 6160, 6184 through Amphitheatre 1 outer wall and seating bank deposits (for location, see Fig 103).

the sequence of deposits varied between sterile coarse sands and artefact-rich dumps, including (2450), (2431), (2461), (2542) and (2543). Towards the base of the sequences some uniformity could be identified between the two excavated blocks, suggesting that (2514) was equivalent to (2556) and (2513) was equivalent to (2555).

This small sample through the seating bank deposits of Amphitheatre 1 in Area B suggests that the material for the bank comprised a mixture of sterile, redeposited natural material, perhaps linked to the deepening of the arena, and rubbish derived from the legionary fortress or outlying *canabae* (see Finds and dating, below p 128).

Previous work

Seating bank deposits

The terrace cut in the primary seating bank to accommodate the timber-framework is a consistent feature at least of the northern half of the *cavea*. In Matthews' Trench XII it seems that the terrace was recorded. In the section (Fig 58), although the relationship was truncated by Thompson's trench, it seems likely that the flat-bottomed cut (M248), interpreted by the excavator as a Roman pit, was in fact the base of the terrace. Context (M247) would therefore be the equivalent of the Phase 6 terrace fill following the installation of the timber-frames.

Although Thompson excavated to a point short of the terrace edge in his Area A68/3 (Fig 19, above p 96), elsewhere the cut was seen and fortuitously recorded, though its importance was not appreciated. It is most



Fig 105 Thompson's photograph of Area A68/4 (Fig 19) showing flagged timber uprights and the cut of the terrace for the timber framework to the right.

apparent in a rare colour photograph (Fig 105) taken in his Area A68/4 in the eastern *cavea*. The picture is looking towards the north-west. The red sand backfill of the terrace is clear, and the positions of timber uprights are marked by red-flagged survey arrows, but to the right of the view the ranging pole is laid on a pale brown material that butts against a high-standing piece of the outer wall. The cut line is very clearly visible to the left of the pole. The distinction is also clear in two of Thompson's published black and white photographs of the same area, one of which shows the line emphasised by trowel-scoring (Thompson 1976, pl

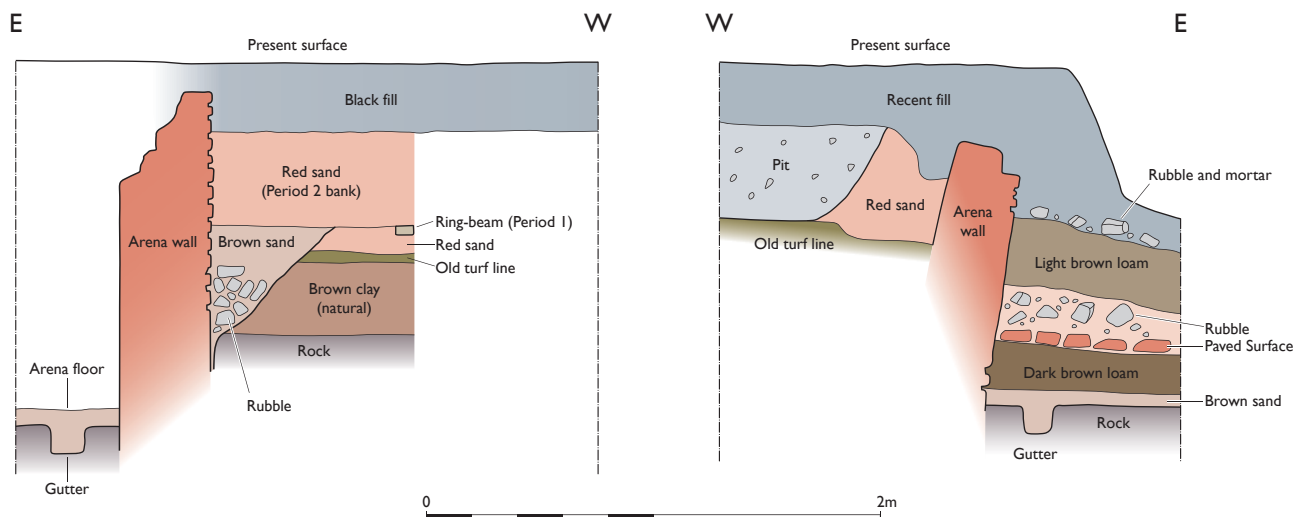


Fig 106 Sections through the arena wall (after Thompson 1975, fig 5).

xxxiv c and d). The cut is also apparent in a section drawn by Thompson's team in 1960 (p 122, Fig 107a).

Two post-holes recorded by Newstead and Droop (1932a; Fig 193) may, by their position be aspects of the timber framed seating.

The arena and arena wall

The northern half of the arena was examined both by Newstead and Droop (1932a) and by Thompson (1976). Matthews (*et al* 2003) also re-excavated portions of the arena to clarify specific points (Fig 24, I, II, III). The arena floor was encountered in Area C of the recent excavation, recovering a central feature of Amphitheatre 2 in Phase 9 (p 194). The floor was altered extensively by the activities of Phase 10 (See Vol 2 of this report), and nothing that could be attributed to Amphitheatre 1b was identified.

On the western side of the amphitheatre, the arena wall in its surviving form is now thought to belong to Amphitheatre 1b. As already stated, the relationship between the seating bank and the arena wall was largely lost during the consolidation work, however, Thompson recorded two sketch sections in his notebook which show this relationship, and these were published (Thompson 1976, fig 5). The illustration is reproduced as Fig 106. Both sections are stated to be to the south of Entrance 10, thus slightly south of the western edge of Area A. The second section shows the arena wall slumped forward into the arena fill, with the red sand of the seating bank behind it, cut by a later pit. The first section is more informative. Here, natural sandstone ('rock') is overlain by a natural brown clay and an old turf line. These we can identify as natural glacial material overlain by the cultivation soils of the pre-amphitheatre phases. Above this, a deposit of red sand lies beneath the inner butt-end of a radial timber beam. Thompson's plan (Fig 20) shows that the butt-ends of several radial timbers were noted, situated inside the

line of the inner ring-beam; in fact this was the main archaeological aim of his trenching around the inside of the arena wall (Thompson 1976, 146). The lower red sand may be a residual element of the Phase 4 seating bank of Amphitheatre 1a. If so, it would form the base of the cut for the timber-framework. This lower sand was cut by what appears to have been a construction trench for the arena wall. The construction trench cut through the soft deposits overlying natural sandstone bedrock, then through the bedrock to a depth of approximately 1 m. The trench was filled with rubble and brown sand, and this was sealed by the layer of red sand that also sealed the base-plates of the timber-framework. From this section therefore it appears that the arena wall was constructed from the same level as the timber seating framework.

Thompson's three sections drawn in 1960 are published here for the first time (Fig 107). These are the only other sectional records through the *cavea* in which the arena wall is tied into the seating bank stratigraphy and can be seen with relation to the outer wall and the timber ring-beams. The two facing sections at the west end of the trench cut for the concrete retaining wall (Fig 18, Tr 1: Fig 107a, b), seem to show a similar relationship between the deposit associated with the timber seating framework and the arena wall as the published section, although some of the relationships are lost through later pit digging. It is clear that in this part of the site the natural rock was deeper than at the point where the published section was drawn. At this point the construction trench for the arena wall was deeper, as the soft deposits were deeper. Comparison between these sections and the outline section Fig 107d (for detail see Fig 74, S6091) clearly demonstrates that Thompson recorded the lower part of the cut made to install the timber seating in one of these sections (Fig 107a). Figure 107c is the section recorded through the amphitheatre in the edge of the cellar of St John's House in 1960. Here the relationship between

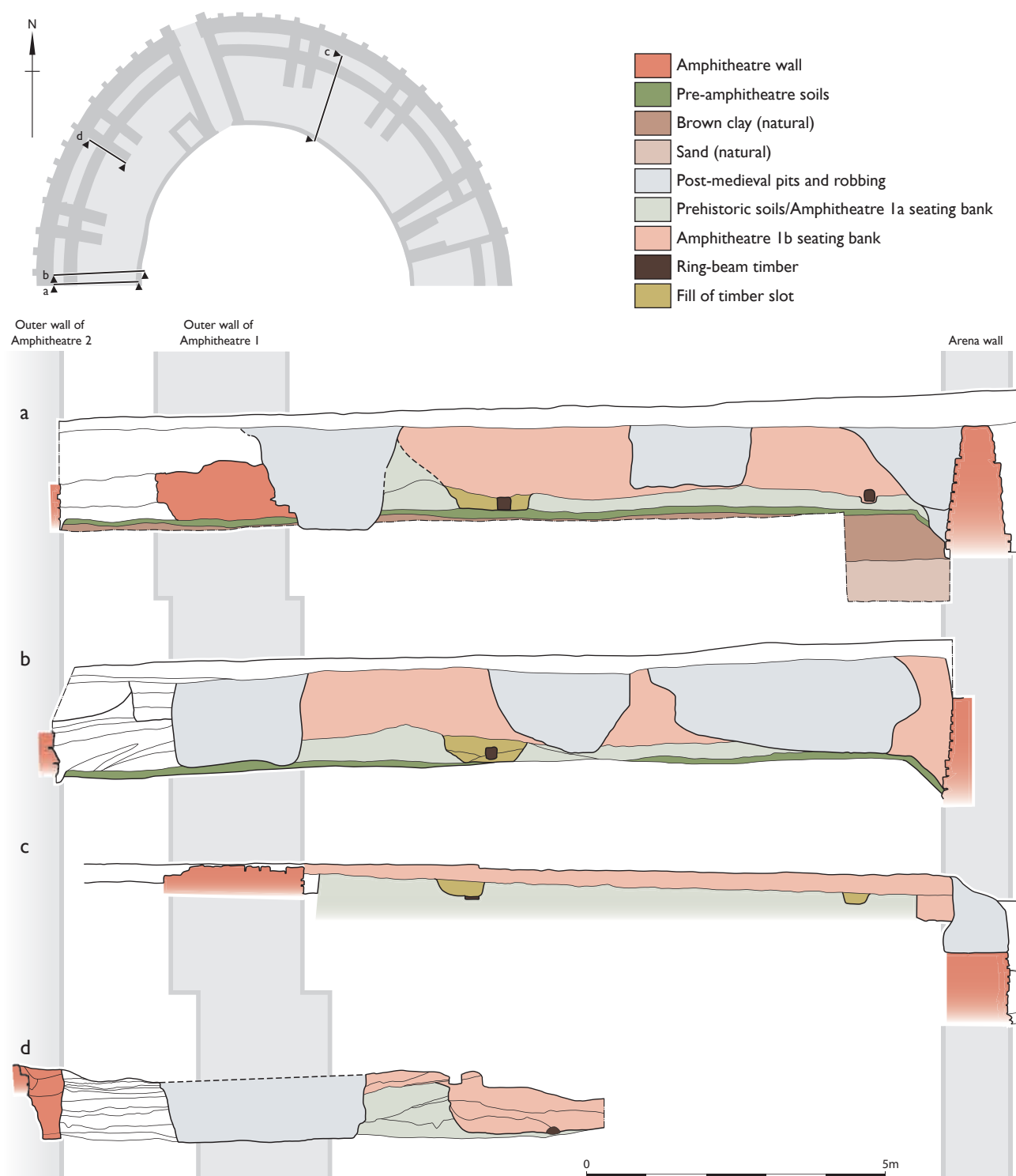


Fig 107 Sections across Amphitheatre 1b recorded in 1960. (a) North facing section of concrete retaining wall trench, west end; (b) South facing section of concrete retaining wall trench, west end. The stratified deposits between the outer walls of the two amphitheatres can be seen in this image; (c) section under the St John's House cellar wall; (d) outline section in Area A (for detail see Fig 74, S6091).

the *cavea* and the arena wall was destroyed by the robbing of the arena wall.

The best surviving portion of the arena wall was excavated by Newstead in the south-west corner of the

excavated area. Here the wall measured 2.85 m in surviving height above the arena floor, the lower 2.17 m retaining its facing stones (Fig 108a). It measured from 0.61 to 0.91 m in width. The survival of the rest of the wall varied.



Fig 108 The arena wall as excavated in the south-west corner of the consolidated area. (a) Thompson's photograph following the re-excavation of the arena wall in 1965. (b) The wall as exposed by Newstead. Both show the peripheral arena drain. Note the arena wall sagging forward. This was jacked up and consolidated by Thompson.

Beyond the high-standing section the wall was leaning into the arena (Fig 108b), elsewhere it was totally collapsed, robbed, or destroyed by post-Roman pit digging. Like the outer wall, the arena wall was constructed in coursed rubble (Hill 1981) of standard legionary work. Many patches of plaster rendering were found adhering to the stonework (Fig 109). Thompson (1976, 146–7) commented that the wall was built of 'sandstone blocks of an average height of 127 mm and variable length ... roughly coursed, but the effect was so irregular that clearly these renderings were intentionally applied in order to disguise this rough appearance'. The rendering was painted, and Newstead and Droop (1932a, 18) identified paint in red, yellow and white which had 'been definitely blended together, seemingly to produce a marbled or parti-coloured effect'. Thompson found two primary coats of hard white lime plaster, both painted dark reddish brown. Over this was a coarse sand-and-lime plaster 25 mm thick. No surfacing or colouring survived on this layer (Thompson 1976, 146). The construction of the amphitheatre by legionary troops is attested by a centurial stone found built into the arena wall recording work by the century of Refidius (> *REFIDI*: RIB III, 3156). This primary inscription was only noted when plaster was removed from the wall face (Thompson 1976, 176). The wall was clearly capped by coping stones, many of which were found in the arena fill, however it

is probable that these relate to Amphitheatre 2. They are therefore discussed under Phase 8 (p 191).

At the foot of the wall was a peripheral drain or gutter (Fig 109) cut into the bedrock at a distance of 300 mm from the face of the arena wall. This was on average 300 mm wide and 260 mm deep. It was filled with clean sand and loose-packed stone (Newstead and Droop 132, 21; Thompson 1976, 151–2), and probably acted as a soakaway, collecting excess water that had seeped through the seating bank. The lack of silt washed into the gutter, however, suggests that the drainage properties of the natural sandstone rendered it effectively unnecessary. It is probable that the peripheral gutter was designed to discharge into an axial drain which ran across the arena from north to south. Although such a drain was identified by Thompson (1976, 151–3), its interpretation is not without problems and it will also be discussed under Amphitheatre 2 (p 191).

The archaeological evidence for the treatment of the arena floor in general probably reflects the later periods as well. However, to place into context some of the evidence for the use of Amphitheatre 1b in Phase 7, it is worth noting Thompson's findings. He recorded the sandstone bedrock of the arena floor as being fairly level, but containing many small hollows which he attributed to glacial action. Given the fact that this was an artificial level, these hollows may



Fig 109 The arena wall exposed by Newstead showing traces of plaster render on the face.

have been caused by natural fissuring which it had proved impossible to level completely. Over this was spread a layer 150 mm thick of yellow-brown sand (Thompson 1976, 150). This deposit was also recorded by Newstead and Droop (1932a, 20), who recorded it as ‘remarkably clean’.

The Nemeseum

The *Nemeseum* was originally discovered by Newstead and Droop (1932a, 14, pl xvi, Site 4; fig 13), who identified the doorway into the chamber through the arena wall. It was completely excavated by Thompson in 1965–6, and identified by the discovery of two altars, one of which was dedicated to Nemesis (Thompson 1976, 166–170; p 156). Thompson considered that the chamber was of one build with his stone amphitheatre and this coloured his recording. No attempt whatever was made to investigate the stratigraphic or structural relationship between the *Nemeseum* and the rest of the *cavea* before this was destroyed by the pouring of concrete around the walls (Figs 21, 110). There are several problems with Thompson’s interpretation. Though the results of the recent work and an examination of the consolidated remains, combined with a re-examination of Thompson’s photographic record, presents potential solutions, the place of this structure in the phasing of the two amphitheatres is one of the more



Fig 110 (a) Post-consolidation photograph showing the divergence between the west passage wall of the north entrance of Amphitheatre 2 (right) and the eastern side wall of the *Nemeseum* (left), viewed from the arena. (b) Thompson’s excavation photograph clearly shows the butt-joint between the rear and east walls of the *Nemeseum*. (c), (d) Post-consolidation photographs showing the outer face of the east wall of the *Nemeseum* built on a foundation of cobbles that appears to be cut by the large masonry of the *Amphitheatre* 2 passage wall. (e) post-consolidation photograph showing infill in the junction between the west *Nemeseum* wall and the arena wall.

intractable issues in the interpretation of the buildings, and remains beyond absolute resolution.

Thompson's published plan (Fig 20) shows the main issue, namely the strange acute angle at which the chamber is set with relation to the side-walls of the north entrance of Amphitheatre 2 (Entrance 12). This is still more striking when viewed from the arena (Fig 110a). A scan of Golvin's (1988) catalogue of amphitheatre plans shows that chambers flanking arena entrances are universally square to the entrance and usually share a party wall. No plan apart from that of Chester shows such a chamber at this sort of angle to the entrance (although at Oudhna, Tunisia a *carcer* (or shrine) opening off the service corridor adjacent to one of the main entrances was independent of, and skewed to the side-walls of the entrance (Ben Hassan and Golvin 2004, 122, fig 8)). This is clearly a serious anomaly and suggests that the two structures are not part of a contemporary plan. If this is the case, the *Nemeseum* pre-dated the construction of Amphitheatre 2. The simplicity of Amphitheatre 1a together with the fact that major alterations took place in Phase 6, including the deepening of the arena and construction of the extant arena wall, suggests that it was to Amphitheatre 1b and to these changes that the *Nemeseum* belongs.

Close examination of the consolidated walls and the excavation photographs show, however, that the walls of the *Nemeseum* are not, as Thompson thought, of one build. Thompson's only photograph to show the rear wall of the *Nemeseum* prior to the pouring of concrete (Fig 78b) reveals a ragged end to the north-east wall of the structure, butted on each side by well coursed masonry (though now impossible to photograph, the concrete does not quite butt up to the rear wall at this point, and it is still possible to see this wall stub (in shadow in Fig 110c)). The idea that this wall is primary seems to be confirmed by the fact that the rear wall of the chamber shows a clear internal butt-joint against it (Fig 110b).

Figure 110c and d show that this wall sits on cobble foundations of a type that would be placed in a foundation trench, yet two courses of cobbles are exposed in elevation in the modern consolidation. The cobbles also seem to be much broader than the wall they support. The cobble foundation does not belong to the side-wall of the Amphitheatre 2 passage; in common with the rest of Amphitheatre 2 the foundations of this wall are composed of large sandstone slabs (p 165). In short, the broad cobble foundation seems to have been cut by the construction of the later passage wall and revealed by its later robbing. It seems at least possible that the broad cobble foundations were an aspect of the entrance to Amphitheatre 1a and/or 1b despite the fact that it is not aligned with, and is on a different level to, the radial wall that is of one build with the primary outer wall (1124) (Figs 48, 53, 111a).

It is difficult to interpret the apparent small piece of well-coursed wall on the north-east side of the stub (Fig 78b) other than as some addition to or alteration of this wall, but it is now impossible to assess this. It is possible

that the broad cobble foundation was itself a modification of the entrance of Amphitheatre 1a, and was contemporary with the building of the *Nemeseum*, albeit reusing a piece of existing wall. As mentioned, the rear wall of the chamber butted the wall on the north-east side. This rear wall was bonded, and of one build with, the wall on the south-west side. However, not only was the outer wall butt-jointed with its north-eastern counterpart, but butt-joints also exist between both side-walls of the chamber and the arena wall (Fig 110e). These features are more likely to reflect a sequence of building than separate phases divided by long periods.

A further factor is that it can be argued that the timber seating framework was built to respect the chamber. The two radial timber-frames to the immediate west of the *Nemeseum* (radial timber-frames 5 and 6, pp 99–100) contained two short timbers to form the base-plate (Fig 82b), while all other base-plates featured single continuous beams. The inner butt-ends of the outer short timbers align exactly with the back wall of the *Nemeseum*, and might have continued a pattern of short timbers used behind the chamber. Thompson's plan (Fig 20) implies that the base-plates were cut by the back wall, but his photograph (Fig 78b) only shows them cut by the trench for the concrete retaining wall which was excavated before he began work on the *cavea* in this area, so this plan must be seen as unreliable, and of course the excavators of the 1960s did not recognise that radial timber-frames 5 and 6 had interrupted base-plates.

A model that fits the evidence, although not without problems, is as follows. The remodelling of the entrance would have occurred first, perhaps involving the laying of the broad foundation and the construction of a new north entrance passage (Fig 111a), incorporating the earlier wall. This would probably be undertaken along with the building of the timber-framework. Both these operations would precede the deepening of the arena, as the spoil from this sealed the base-plates of the timber-framework. The short base-plates would then have been installed behind the planned line of the *Nemeseum* back wall before the *Nemeseum* was cut through the earlier seating bank and the underlying natural, an exercise which would have been carried out simultaneously with the deepening of the arena, as the *Nemeseum* floor, like the arena itself, was cut down to bedrock. The square cut would then be revetted by the south-west wall and the rear wall, which abutted the putative entrance passage (Fig 111b). The last stage would then be the construction of the arena wall with the doorway from the arena into the chamber. This wall butted against the ends of the side-walls (Figs 110e, 111c).

The doorway had a low stone threshold. Thompson recorded joist slots which would have served to support a timber floor (Fig 112). It seems likely that such a floor would have been level with the stone threshold, and this would conceivably have been the intended level of the sand added to the arena. Thompson's (1976, fig 14) section



Fig 111 Postulated phasing plan for the *Nemeseum*. (a) Amphitheatre 1a unfinished wall with relation to the earliest parts of the *Nemeseum* the cobble foundation and the north-east wall. (b) Amphitheatre 1b – the rear and south-west walls of the *Nemeseum* added to the earlier wall after the deepening of the arena and cutting the *Nemeseum* out of the primary seating bank. Short radial base-plates installed behind and to the immediate west of the *Nemeseum*. (c) The cell is finished with the building of the arena wall, which butts the ends of the side walls.

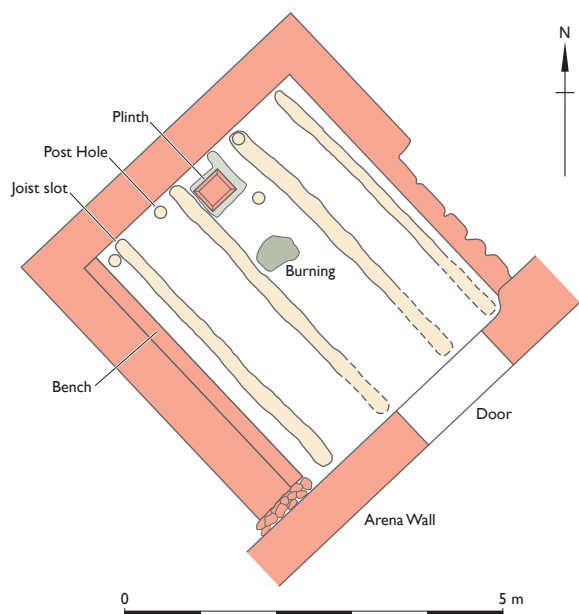


Fig 112 *Nemeseum* floor plan showing joists (after Thompson).

through the chamber suggests that all subsequent deposits and finds, including the altar that gave the interpretation were deposited later. These are discussed in Volume 2 of this report.

Finds and dating

By Gillian Dunn, Alison Heke, Quita Mould, David Shotter, Margaret Ward and Tony Wilmott

The finds from Phase 6 in Areas A and B are from very different context groups. The deposits in Area A certainly belonged to the period of alteration of Amphitheatre 1. For Area B it is necessary to add the slight caveat that some of the upper layers of seating bank dumps analysed as part of this phase may have been added as part of the construction of Amphitheatre 2.

Area A

The lower layer of the fill of the terrace cut to install the timber framing (1132), (1214) and (1138) produced a very fragmentary assemblage of 50 sherds of late 1st – early 2nd-century local oxidised and reduced ware vessels. Pottery was also recovered from seven of the sixteen radial timber-frame slots excavated (p 290, Table 61). All of this material is of mid/late 1st to early 2nd-century date, except for one sherd of Dorset BB1 from the base-plate of radial timber-frame 11 (923). As a small body sherd it is difficult to identify it to a definite form. Traditionally the appearance of this material in Chester has been dated to AD 120+, contemporary with the mass importation to the northern frontier in the Hadrianic period, but see below (pp 157–8).

Material from the layers around the base-plates and uprights and other re-deposited layers comprised a range of fabrics including red colour-coated, grey, white and orange

vessels and a black calcite-tempered ware. There were numerous cross-joins of sherds from the layers associated with the structural alterations in this phase. These sherd links are due to the material deposited in Phase 4 as part of the construction of Amphitheatre 1a being disturbed in Phase 6 during the excavation of the beam-slots.

There were only six fragments of samian ware. Five were of Flavian-earlier Trajanic origin, none weighing more than 2 g. The sixth sherd, from a bowl produced c AD 65/70–85, was decorated, but this scrap weighed <1 g when recovered from context (1121). Only two copper-alloy objects were found in this phase – a small rosette stud (possibly from a military apron) from (516) (Func Cat no 33), from the fill of the outer ring-beam, and part of a flat-headed tack. The assemblage also included undiagnostic fragments of glass and lead, 99 fragments (423 g) of CBM comprising roof tile fragments and a fragment of finial. As well as the structural nails noted above, iron finds included a small socket (Func Cat no 3), a brooch spring (Func Cat no 43) and 16 hobnail fragments (p 331, Table 70).

A single coin was recovered, from the lens of redeposited turf above radial timber-frame 8 (886). This securely stratified coin (CO25) dates to the end of the reign of Domitian, AD 92–4.

Area B

The seating bank deposits produced 1,721 pottery sherds (15,314 g). There is a wide range of fabrics, both fine and coarse, and vessel forms, including jars, lids, flagons, beakers, dishes, bowls, tazze and a colander/strainer. It is somewhat unusual, however, in an assemblage of this size to have only eight sherds of mortaria. Though the majority of vessels are plain, there are examples of burnished, rouletted, roughcast and rusticated vessels, and some with orange-and-white painted decoration (pp 291–4).

The dating of the deposits is hampered by the lack of recognisable forms. The vast majority is dated to the late 1st to early 2nd century. The only sherds deviating from this are just three body sherds of Dorset BB1 (see below), and a fragment of a mortarium in a Wilderspool white-slipped orange fabric, which is a typical 2nd-century form. There is also a north African amphora, imports of which commence in the 2nd century but which is a type more common in the 3rd and 4th centuries.

A total of 165 sherds of samian ware represent 148 vessels, though almost half were scraps weighing <1 g (p 251). One stamped vessel was produced in the range AD 65/70–95, and amongst the many certainly Flavian, products one stamp represents a potter active AD 75–110, though the dish itself was probably produced by AD 90 (Sam Cat no 21). The latest vessels were produced in the Domitianic to earlier-Trajanic range (c AD 80–110; Sam Cat no 22) though there were no certainly Trajanic products in this phase.

Most of the copper-alloy objects from these contexts are

fragments of sheet, studs, pins and tacks, though there are also two ?mounts (Func Cat nos 36, 123) and a 1st/2nd-century trumpet brooch (Func Cat no 41). These contexts also produced 308 fragments of lead, mostly waste, along with fragments of offcuts, strips and sheet. The assemblage includes three discs, a ring and a probable weight (Func Cat nos 255–257, 249, 260). Broken pieces of iron were noted in the assemblage, including 429 hobnails (p 332, Table 70), a decorative stud (Func Cat no 97) and a small number of broken ‘figure-of-eight’ links from chains that could have been put to a number of uses came from contexts (2513) and (2543). Iron objects also includes a small knobbed ferrule (Func Cat no 2), fragments of plate armour (Func Cat nos 9–11), fragments of armour buckles (Func Cat nos 18, 19), an iron bow brooch (Func Cat no 42) and a finger-ring (Func Cat no 50). Iron tool fragments include part of a hand saw (Func Cat no 90) and three collar-ferrules from tanged tools (Func Cat nos 91–93), a ring-headed pin (Func Cat no 134) and a broken arm from a joiner’s dog.

Ninety-eight percent of the glass from this phase is from the seating bank deposits. There are 63 fragments of window glass, all of the matt-glossy type and therefore dating to the 1st to 3rd centuries (p 341). Most of the vessel glass is blue-green but there are also colourless, pale green, light green, green-tinged colourless, yellow-brown, blue and polychrome fragments. Where the fragments can be identified to vessel form the assemblage includes bottles, both cylindrical and prismatic, a possible base fragment of a jar (Glass Cat no 12), a yellow/brown pillar-moulded bowl (Glass Cat no 15), a flask/bottle (Glass Cat no 13), beaker and a handle fragment of a flask or flagon (Glass Cat no 14). Twelve fragments of polychrome dish/bowl were recovered from the seating bank (Glass Cat nos 7–10) (pp 309–10).

These deposits also produced three fragments of 1st–2nd-century turquoise frit melon beads (Func Cat nos 69, 70, 72) and one of an amber bead (Func Cat no 71). There is also a group of forty-seven plano-convex glass gaming counters in a variety of colours, thirty-eight of which are complete (Func Cat nos 140–186: p 337–41 Fig 313). There are also six bone counters (Func Cat nos 190–195).

As in other finds categories, the assemblage of CBM from these deposits is the largest from stratified Roman deposits, comprising 4,202 fragments (35,480 g) (p 360). Most are indeterminate pieces but a range of identifiable forms was also recovered. These mainly comprise fragments of roof tile and brick with small numbers of box-tile, facing tile (*parietalis*) and herringbone-floor brick. Four fragments of portable oven were also recovered, from (2513) and (2543). Datable forms comprise two Warry group A *tegulae*, from (2498) and (2431). A combed box-tile from (2513) is likely to post-date *c* AD 100. A probable group Warry D1 *tegula* from (2500) dated *c* AD 240–380 seems to be intrusive to the phase, and may derive from deposits added to the seating bank in later phases.

As might be expected from a major dump of refuse

from other parts of the settlement, the largest volume of faunal remains comes from these deposits (pp 410–11). These include the three major domesticated species – cattle, sheep and pig – but unlike the deposits in Area A, here pig (40% of the assemblage) outnumbers cattle (38%), with sheep making up most of the remainder. It is unusual, if not unique, for pig remains to outnumber cattle at Romano-British sites of this period. The assemblage also includes bones of dog, hare, small mammals and rodents in large numbers (Table 121) and the largest group of chicken, woodcock and songbirds from the site (Table 119). A varied assemblage of plant material from the seating bank may indicate the incorporation of animal dung or stable waste (p 379). The fish bone content of these was very substantial, representing all of the principal species of fish identified from the site (Table 134); similarly, a large quantity of shell, predominantly oyster but also including mussel was also found in these contexts, with context (2612) yielding more shell than any other Roman context on site. (Carrott and Beacock 2009).

AMPHITHEATRE 1b USE (Phase 7)

The outer wall of Amphitheatre 2 was constructed concentrically around its predecessor (p 162) at a distance of 1.8 m. This meant that a narrow band of stratified deposits up to 1.8 m wide survived surrounding the outer wall and exterior stair of Amphitheatre 1b. These deposits, therefore, preserved evidence for the kinds of activity that occurred around Amphitheatre 1b during its use. The authors have examined the literature of the archaeology of the Roman amphitheatre in vain to find any other amphitheatre where such evidence survives. In the current state of knowledge these deposits appear to be a unique survival. Thompson did not record any of this material in plan, although it does appear in some of his section drawings (Fig 107b). Matthews also recorded some of these deposits in section, in his Trench XI, though he interpreted them as the filling of a supposed corridor between the outer walls of the two amphitheatres, assuming with Thompson that these were the contemporary walls of a single stone amphitheatre. In his Trench X these deposits were also seen, although here a tentative interpretation was that the sands were water-lain.

Area A

The walls of Amphitheatre 2, including the *vomitorium* (Entrance 11) divided the surviving deposits in Area A into two stratigraphically discrete areas, one to the south and west of the later *vomitorium*, the other to the north and east. Though separated, the sequences can be seen as similar. Certainly the area around the amphitheatre appears to have been formalised to some degree during this phase, and a road was laid along the northern side

of the building. The two earlier cess pits at the northern and western ends of Area A were sealed with rubble and clay over which were laid fine, compacted road surfaces. The cess pit by the north entrance (1078) was capped

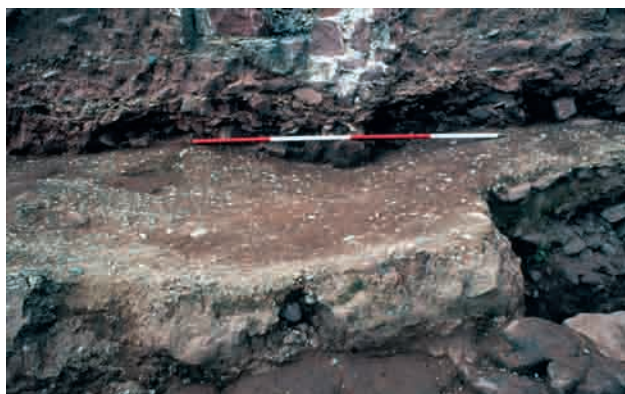


Fig 113 First metallated road surface over cess pit to the north of Area A (1066). Note subsidence into underlying pit.

by a deposit of rubble (1081), which was sealed by clay (1067) to level the ground for the first of a sequence of road surfaces (1066) (Fig 113, 123). This was a firm, very well compacted mass of small pebbles with occasional larger pebbles. It became heavily worn, and was succeeded by a sequence of similar metallated surfaces and patches (1039, 1012=1019, 1038, 1088–90). The latest of these (1038) was the surface from which Amphitheatre 2 was built. Similarly the western cess pit (1256) was sealed by a deposit of rubble (1064) that acted as bedding for a fine road surface (1028), which was also the level from which Amphitheatre 2 was built (Fig 114).

South and west of the vomitorium

This area was bounded to the east by the amphitheatre wall and the external stair and to the west by the foundations of the outer wall of Amphitheatre 2. That the area was the focus of intensive activity is shown by the very complex series of deposits recorded. The area was subject to continuous deposition and truncation in many episodes



Fig 114 Plan of the area outside Amphitheatre 1a to the south-west of Area A showing earliest deposits and layout. In particular note the road (557/1028).



Fig 115 (a) The area outside Amphitheatre 1a to the south-west of Area A, viewed from the north, showing the kerbed road (577) (b) The same area from the same viewpoint showing the yellow sand deposit above road (557). To the left of the ridge of sand over the kerb (compare a) the slope created by the removal of most of this deposit in antiquity is well defined.

in antiquity, to the extent that only the earliest of these episodes could be clearly understood.

Two successive deposits, the first (1056) of friable red-orange sand and the second (1053) of compact grey clay, followed the construction of the external stair and pre-dated the creation of the road. The road (557) was laid in a shallow cut through the earlier deposits. It comprised a surface of small pebbles set in sandy clay and heavily compacted, and was bounded on the south side by a kerb of large, sub-angular sandstone pieces set into the edge of the preparatory cut (Figs 114, 115a). The road surface was at the same level as (1082) to the west of the wall of Amphitheatre 2 and identical in composition. It is certain that this is part of the same road which was therefore at least 5.2 m in width. It ran from the south-west to the north-east along the edge of the first amphitheatre, and was almost completely eradicated by the excavation of the foundations for the second building. Small lengths of linear wheel-ruts alongside the kerb (955, 959, 960, 961), each around 40 mm in width and cut into the earlier layers

(1056) and (1053), may show where wheeled traffic has from time to time slipped off the side of the kerb.

The road edge was sealed by a major dump of yellowish-brown sand (Fig 115b). This material (899) was 90 mm deep at its deepest point, which formed something of a ridge over the road kerb. It was thinly spread over the metalling, but sloped downwards towards the wall of the amphitheatre. This slope, which is very clear in Fig 115b, appears to have been formed by the removal of a large part of the yellowish-brown sand deposit. It is suggested that this material was dumped across the area and subsequently removed wholesale. It is probably no accident that the ridge of surviving sand is over the roadside kerb, as this is where it would be difficult to shovel away due to the underlying uneven stones. The character of the deposit is similar to the description of the layer, 150 mm, thick of yellow-brown sand (Thompson 1976, 150) which covered the floor of the arena. The most likely explanation of the deposit is that it was either imported and dumped against the amphitheatre wall to be carted into the arena when needed, or that it



Fig 116 The area to the south of the external stair. A ridge of residual deposits against the wall, but cut by its robber trench comprises horizontal deposits partially removed, leaving a fillet of material against the wall of the building. At the top of the image the ridge sits against the exterior wall and the south side of the stair.



Fig 117 Horizontal deposits against the outer wall of Amphitheatre 1a truncated in antiquity.

was removed from the arena and piled for subsequent removal from the site. The impression of the deposition and removal of material from this area was reinforced by the fact that, above the sand, against the amphitheatre wall, was a low ridge of reddish silt and sand deposits (870, 871, 877) which survived intermittently around later post-holes (Figs 116, 117). The only reasonable explanation for this phenomenon is that a series of deposits was laid down around the outside of the amphitheatre and that these deposits were truncated and removed. This removal was

not done thoroughly, however, and vestiges of the deposits remained against the wall of the amphitheatre. Together, the ridge of material against the wall, and the vestige of the large sand deposit would seem to show that this area was habitually used for the dumping of material which was to be taken away and either used, or disposed of, elsewhere. The evidence suggests frequent repetition of this activity.

Cutting into these layers, and against the outer face of the wall of Amphitheatre 1b, was a series of three post-holes (Figs 118, 119). These were the supports for a short-lived timber building, tilt, or stall. It was built against the southern side of the external stair and demonstrates that the stair was mounted from the north side. The fact that the vestiges of truncated deposits only survived around these holes suggests that these were protected from trampling by their proximity to the posts. The post-holes (968, 857, 887) were sub-circular, 450–520 mm in diameter, and 260–370 mm deep (Fig 120). The central hole showed signs of re-cutting. The three post-holes on the south side and the stair base to the east delimited an area of level, polished, compact brown clay 4.82 m long, 1.6 m wide and 100 mm deep (894). This deposit was probably a floor surface associated with the post-hole structure.

These features were sealed by an extensive spread of fine yellow-brown sand (838), 50 mm deep (Fig 121). This is interpreted as a further major dump following the demise of the short-lived timber building. To the west of the area two successive localised deposits of reddish gritty sand (837) and grey compact clay (825) were cut by a short length (0.32 m) of a possible beam-slot, truncated at the western end and terminating deliberately to the east (822). The feature was 0.19 m wide and 80 mm deep. It is conceivable that the compacted clay (825) represented a fragment of flooring for a short-lived timber structure associated with this slot, possibly located within an entrance given its relationship with the slot. In the angle formed by the outer wall of the amphitheatre and the back of the external stair was a small dump of red silty sand (855), probably either the remnant of more widespread deposits which had been cleared, or simply a dump made in a convenient corner. This was cut by a post-hole measuring 0.7×0.2 m in plan and 0.21 m deep (854). This may have been part of the temporary structure represented by the beam-slot (822).

The beam-slot was sealed by a small, probably truncated dump of yellow-brown sand (817). It is apparent that the partially preserved timber building and the yellow sand deposit (838) had again been truncated. Along the edge of the outer wall of the amphitheatre was a ridge of reddish sandy clay with inclusions of tile (847–848) (Fig 116). There can be no doubt that this material represents the remnant left against the wall of level dumps, which have been cut away to level the area outside the amphitheatre. They were not deposits simply dumped against the wall, as they contained horizontally laid micro-stratigraphy. It seems likely that the removal of these deposits for redeposition



Fig 118 Plan of the area outside Amphitheatre 1a to the south-west of Area A showing three post-holes of a temporary structure.

elsewhere also removed most of the evidence for the earlier timber structure.

Following this clearance episode dumping around the amphitheatre began yet again. The first dump was a complex deposit of yellow, brown and red laminated sands with some clay laminations, reflecting frequent individual dumps within an ongoing process (827). Above this was a very widespread deposit, 0.15 m deep, of fine laminated sands with multiple brown lenses and bands reflecting multiple deposition episodes (556).

A widespread dump of reddish sand (798) above (556), and a narrow dump of reddish-grey mixed sandy material against the outer wall of the amphitheatre (864) showed a distinct slope downwards from where they had lain against the amphitheatre wall. Above (864), forming a ledge against the outer amphitheatre wall, were further deposits of grey and red clay (839, 840, 841, 844) (Fig 117). Originally horizontal deposits, these too were, as in earlier episodes, partially removed, surviving only as vestiges of the removed deposits against the wall of the building.

The cut-interface to the south of the external stair which reflects this truncation event was given the context number (853). Once again, renewed deposition took place against the residual bank of earlier deposits. The first such deposit was a clay layer containing finds, which appeared more like an occupation surface (796) than the underlying sandy dumps, though there were no visible structural elements associated with it. This trampled clay surface was overlain by two successive layers of yellow-orange sand (791, 786) that spread across the entire area between the two outer amphitheatre walls. A small deposit of crushed sandstone within this sequence (785) was covered by further, yellow-red, sand layers (770, 771).

North of the external stair the sequence was less complex, probably reflecting the need to access the stairway from this side. A small fragment of a cobbled surface (707) survived above a deposit of yellow-brown sand (747). This was replaced or re-surfaced by a rough stone surface (Fig 122) which may have had a finer upper surface originally (697). This was associated with a post-hole (648) set against



Fig 119 The area outside Amphitheatre 1a to the south-west of Area A showing three post-holes of a temporary structure against the outer wall of the amphitheatre, viewed from the south.

the outer face of the amphitheatre outer wall. The stone surface was overlain by a yellow-orange, sand deposit with dark, clayey lenses. Adjacent to the eastern foot of the stair was a small pit (728, fill = 727), which was sealed by a rough deposit of red sandstone (682). The latter may have derived from the building of Amphitheatre 2, as may a more extensive deposit of mortary sand and sandstone fragments, which lay above (554).

All of these deposits were sealed by a further widespread and substantial deposit of orange-yellow sand of a maximum depth of 0.24 m (555). This pattern of dumping, short term occupation and truncation continued after this major deposit was laid down. South of the external stair a possible surface of compacted gravel, sand and sandstone fragments (745) occupied the site of earlier surfaces, with a small patch of slag and industrial debris upon it (746). At the back of this area a rectangular pit measuring 1.5×0.6 m and 0.22 m deep (737) was cut. It seems likely that it was associated with the use of the gravel surface, though its fill (736) was largely sterile buff sand, and contained no hint as to its function. A small patch of yellow sand

(717) lay to the north of this feature, and a further gravel surface (716) overlay both the backfilled pit and the sand patch. This may have been yet another deliberate surface and was sealed by a final yellow sand deposit (715).

North and east of the vomitorium

The road identified in the south-west area continued in a straight line until it disappeared into the foundations of Amphitheatre 2. Outside these foundations it appeared as a metalled surface, while between the outer walls, the continuation of the sandstone kerb built to retain the south edge of this road, closest to the amphitheatre, was traced (1034) (Figs 123, 124). To the north of the kerb was a remnant of fine surfacing similar to (1066). The kerb was raised 0.12 m above the level of the latest surface of Phase 5 (1036), and lay at a minimum distance of 1.4 m from the wall of the amphitheatre. The road was not accurately laid out at an even distance from the amphitheatre wall, and this means that much of the feature was cut away by the foundations of the outer wall of Amphitheatre 2. A narrow deposit of reddish clay against the south side of the kerb (830) extended between the facing stones of the kerb edge. It incorporated some pebbles, and appears to be a deposit of mud and kicked pebbles from the use of the road that had accumulated against the kerb-side. It was cut by two linear features (828, 829) up to 2 m long, 0.12 m wide and 0.08 m deep (Figs 123, 124). These were clearly ruts created by wheeled traffic. It appears that vehicles had slipped off the side of the kerb leaving traces in the roadside mud. A further deposit outside the line of the kerb (814) sealed the ruts.

Contemporary with this sequence, and against the face of the amphitheatre wall was a substantial post-hole (1041; fill 1042), 0.46 m in diameter and 0.23 m deep, which again was probably related to a short-lived, temporary structure. To the east of the area, the first of a series of dumps of clean yellow sand (1018=1106) was deposited from the direction of the main north entrance. Though spread over a fairly wide area, this was banked up slightly against the outer wall (Fig 125). A very clear group of three associated post-holes were cut into this primary sand deposit. Hard by the amphitheatre wall was a substantial post-hole, sub-rectangular in shape, 0.6×0.35 m and 0.6 m deep (850). Adjacent, 0.98 m to the west was a smaller rectangular feature 0.45×0.3 m and 0.1 m deep (1016), while 1.4 m to the north of (850), in a line which forms a right angle to the amphitheatre wall was a small post-hole 0.1 m in diameter and 0.08 m deep (1014). This was the same distance from the amphitheatre wall as the kerb, suggesting that this was the required depth from the wall for stalls to be placed between the wall and the road edge. This structure may be the west side of a tent-or awning-like temporary structure of the type known as a tilt. The principal upright would support a ridge along the line of the wall, and presumably fastened to it. This would be stabilised by supports running laterally from the corner. The front of the awning would be



Fig 120 Post-hole (887) in plan and section.



Fig 121 Plan of the area outside Amphitheatre 1a to the south-west of Area A, showing vestigial remains of temporary structures.



Fig 122 Stone surface (697) at the foot of the external stair.

supported on slender posts, which would need to be fastened by guy-lines to pegs. To the south of this was a fragment of mortar floor comprising a creamy-grey mortar with an admixture of straw (963). There was some indication that small stakes had bounded this deposit, possibly as part of a frame within which the mortar had set. It is probable that this was the floor of another temporary structure, possibly bordering the road.

Dump deposits and temporary structures

Above these initial surfaces and primary activity was a complex sequence of dumped deposits. The interpretation of these can be difficult, as it is at this point that later intrusions, particularly medieval pits, begin to obscure the archaeology. The order in which parts of the area were excavated also had an impact on the recording of these deposits. The most detailed recording took place in the area between the later *vomitorium* and a sequence of medieval and post-medieval pits. This provided the reference sequence which allowed the rest to be interpreted properly. Though these deposits were very similar in character, all basically sandy, and many deposits comprising pure yellow or orange sand, there also were intermediate silt deposits. During this sequence of dumping there is evidence for the continued construction of temporary timber structures against the outer face of the amphitheatre wall. This evidence took the form of a small number of largely truncated post-holes. It is possible that

the dumped deposits recorded were the remnant of more substantial deposits which were largely removed, and that the temporary structures were built from higher up in the sequence, leaving only traces of their deeper post-holes.

The earliest of these deposits were rather patchy and localised. At the south-western end of the area was a deposit of sandstone rubble, possibly either derived from a collapsed structure or laid as the basis for a surfaced area (813=812=722) (Fig 126). Above this was a deposit of undifferentiated laminated sand showing a complex pattern of deposition (721) (Fig 127). This layer overlay the kerb to the outer road and seems to be the counterpart of (899) in the south-west area. Above this was a further orange sand deposit (804). To the east a series of deposits was dumped from the area of the north entrance. Though these were very similar in character, very shallow, and amounting to a total depth of 0.30 m, they were clearly the result of individual depositional episodes. The earliest of these (1018) was overlain first by a fine pale yellow sand (992), then, sequentially, a brown silty sand (982), a similar but more gritty deposit (1008), an orange sand containing charcoal flecks (856), and a yellow-orange sand with no charcoal (832). The first one of these sandy dumps to extend as far as the later *vomitorium* was a much-truncated, coarse, orange sand (859=806=951) which lay at a consistent level of 18.65 m OD, and which was cut by a single post-hole (1005) situated 0.6 m from the amphitheatre wall, possibly part of a temporary structure cut from this level. A small yellow sand deposit (950) overlay (951). Two shallow pits (803 and 696), cut from the same level are further evidence of activity on this surface (Fig 128). Two further sand deposits were then dumped from the east, one orange (865), the other light yellow pure sand (761).

This area seems to show the same phenomena of dumping and truncation observed to the south-west, but it was so badly disturbed by medieval and post-medieval pitting (see Volume 2 of this report) that the deposits could not be understood in plan. Small islands of stratigraphy, separated from each other and from the main sequence by later pits (eg Fig 133), showed sequences of dumping of sand deposits (673, 672, 671, 670, 125), occasionally interleaved with pebble surfaces (669, 723) (Fig 129) and post-holes cut from different levels. One such island was excavated out of sequence, the deposits (125–135 incl.) having been initially interpreted as pit fills.

The 'shrine'

The structure interpreted as a small shrine was built after the deposition of these sand layers. It appears to have been of two phases. The first phase consisted of three slots (742), cut into the underlying sand deposits arranged to define a sub-square area measuring 1 m square internally, of which the fourth side was the outer amphitheatre wall. The slots had vertical sides and flat bases, and measured 0.25 m wide and 0.15 m deep. A secondary extension continued the line of the western slot beyond the return. The western slot



Fig 123 Plan of area outside Amphitheatre 1a to the north-east of Area A.

contained in its fill four large stones (741). It seems likely that these slots contained a small, free-standing, timber structure, and that the stones were part of the deliberate back-filling of the slot in preparation for the second phase, stone structure (Fig 130).

The second phase of the structure (Figs 131, 132) was set into a cut measuring 1.2×1.25 m (754), sub-square in plan, with vertical sides and a flat base. This cut shared its outline with that of the preceding slots, but did not penetrate to their full depth. Within the cut was placed a three-sided, stone structure, open to the west, with its south side built along the amphitheatre wall (739). The structure measured 1.4×0.7 m in surviving internal area, and was 0.3 m, or two stone courses, in maximum surviving height. The inner face had three straight sides, but curved corners,

giving the plan of an alcove, and was the only part of the structure which had not been robbed at a later date, apart from the stone core at the back of the eastern wall (811).

The element that marks this structure out as special is the fact that the bottom two courses were plastered (751) to a maximum height of 0.25 m, and that the plaster which had fallen from the structure, and which was found in collapse deposits, was painted. The surviving plaster assemblage indicates that the shrine was probably painted using a simple panel scheme and that it was redecorated at least once during its lifetime. Yellow is the predominant colour, followed by grey, plain white and red. Colours in combination comprise grey/yellow and yellow/red. The redecorated pieces suggest that the original design included areas of blue/green and yellow as well as grey/



Fig 124 Kerbed road (1034) cut to the left of view by the wall of Amphitheatre 2. To the right are the ruts (828, 829) showing where wheeled traffic had slid off the edge of the paved road (Fig 150).



S 6200

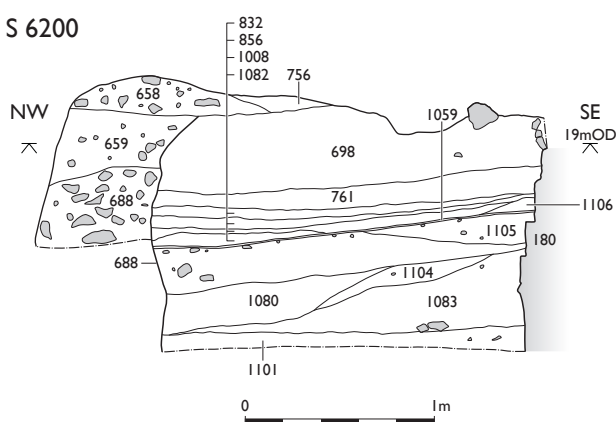


Fig 125 Photograph of and section through the deposits between the outer walls of the two amphitheatres at the north end of Area A (section located in Fig 123).

white in combination. These colours were then replaced by a scheme comprising bands/zones of yellow and white (p 374).

The primary floor surface (18.66 m OD) was a compact sandy deposit with occasional fragments of tile, possibly evidence for an original tile floor (995). Deposits within the alcove which probably pertain to its use were thin bands of hard, compacted sand (795, 790). These contexts contained fragments of fine ware pottery, possibly deriving from the practice of votive offering within the feature. Outside the structure to the west was a deposit of mixed material with charcoal (831, 805), possibly associated in some way with the use of the structure. Within the alcove a further deposit, 0.2 m deep, comprising compact sand, made up the level of the internal surface to 18.80 m OD (755) (Fig 132). In all probability this was done with the intention of keeping pace with the gradual accumulation of further sand dumps outside the shrine, ensuring that it could be used continuously as the ground level gradually rose.

Following the disuse of the feature, the collapse deposits within the alcove contained ceramic building material and painted wall plaster (753, 752=738). The rear wall was robbed (robber trench 820), and the structure was sealed by the continuing deposition of sand in the area (809, 810).

Dumping during and after the use of the 'shrine'

When first excavated in the north-east of the area the laminated sand deposits were at first excavated as a



Fig 126 Sandstone rubble deposit (813).



Fig 127 Laminated and banded deposits of sand (725) above stone surface (813). The section includes contexts (721), (806) and (788) at the top.

single dump (698) 0.4 m deep (Fig 125). This material was distinguished from the underlying sand deposits by the existence of the shrine. It included lenses and bands of contrasting brown silty material, and this suggests that, like the more defined underlying deposits, it represented a series of separate deposits of similar material accumulated relatively slowly, achieving an eventual top level at 19.08 m OD.

To the south and west the dumps were stratigraphically disentangled and recorded individually. The cut feature (803) was filled and sealed by red-brown clay-sand (801) above which further dumps lay. In sequence these were: red-orange clay-sand (797=792) containing a human tooth, fine orange sand (788) (Fig 133), gravel (787), further sand deposits (784, 744), and a sparse sandstone surface (743). These deposits were built up during the lifetime of the shrine. Following the disuse of the shrine the accumulation of surfaces continued. To the north this was represented by the upper levels of sand accumulation (698, 725) (Fig 133) and to the south by a build-up of mixed deposits including yellow sand (Fig 134).

An associated early stone structure?

On the site of the *vomitorium* of the second amphitheatre (Entrance 11) was a structure that seemed to be earlier than, and incorporated into the *vomitorium* wall. This comprised a large, very finely dressed sandstone block $830 \times 740 \times 360$ mm sitting on a flat sandstone block $940 \times 730 \times 710$ mm which was equally finely dressed. The upper stone was neatly squared off on the west and south faces, but not on the north and east sides. On the south side and on the top was a plaster mark indicating that something was formerly attached to the face. Not only was the dressing of the stones different to that of the rest of the masonry of the *vomitorium* (pers comm, Peter Hill), but the sizes of the blocks were also anomalous. In addition, there was an awkward gap between the *vomitorium* wall (711) and the two large blocks. This gap is clearly shown in Fig 135. In

this illustration the material built up against the outer wall of the first amphitheatre can be seen cut by the construction trench (656) for the Amphitheatre 2 *vomitorium* wall (711). This wall was built of a standard size of coursed building stone (p 186). Two courses of this wall almost butted against the blocks which comprised the proposed early structure (740), leaving an appreciable gap which was bridged by the stones of the third course, despite the fact that the height of the large block made the third course uneven. It also created an awkward two-course offset in the face of the *vomitorium* wall (Fig 136a). The blocks were fully incorporated in the *vomitorium* wall as shown in Fig 136b, which shows the wall core to the left of the image, built up against the side of the block. It seems inescapable to conclude that the two blocks represent that part of the footings for a large structure associated with Amphitheatre 1 that was in a convenient position for incorporation into the second structure. If this structure was associated with the first amphitheatre, its position would be at the edge of the road, into the edge of which it would have projected. In fact the stone kerb would have been interrupted by this structure, which will have projected into the roadway (Fig 137).

Previous work

The deposits around the outer wall of Amphitheatre 1b have been recorded previously by both Thompson and Matthews, but not interpreted. In the section of Thompson's trench for the insertion of the retaining wall (Fig 107b), at the west end, sand deposits, interleaved with a layer of sandstone rubble, lie against the 'concentric' wall, and are clearly cut by the construction trench of the outer wall. Thompson interpreted these deposits as deliberate make-up for his later 'stone amphitheatre'. He wrote 'the ground had been made up with a mixed filling of sand and rubble layers to a height of 3 ft (0.91 m) above the old ground surface' (Thompson 1976, 175).

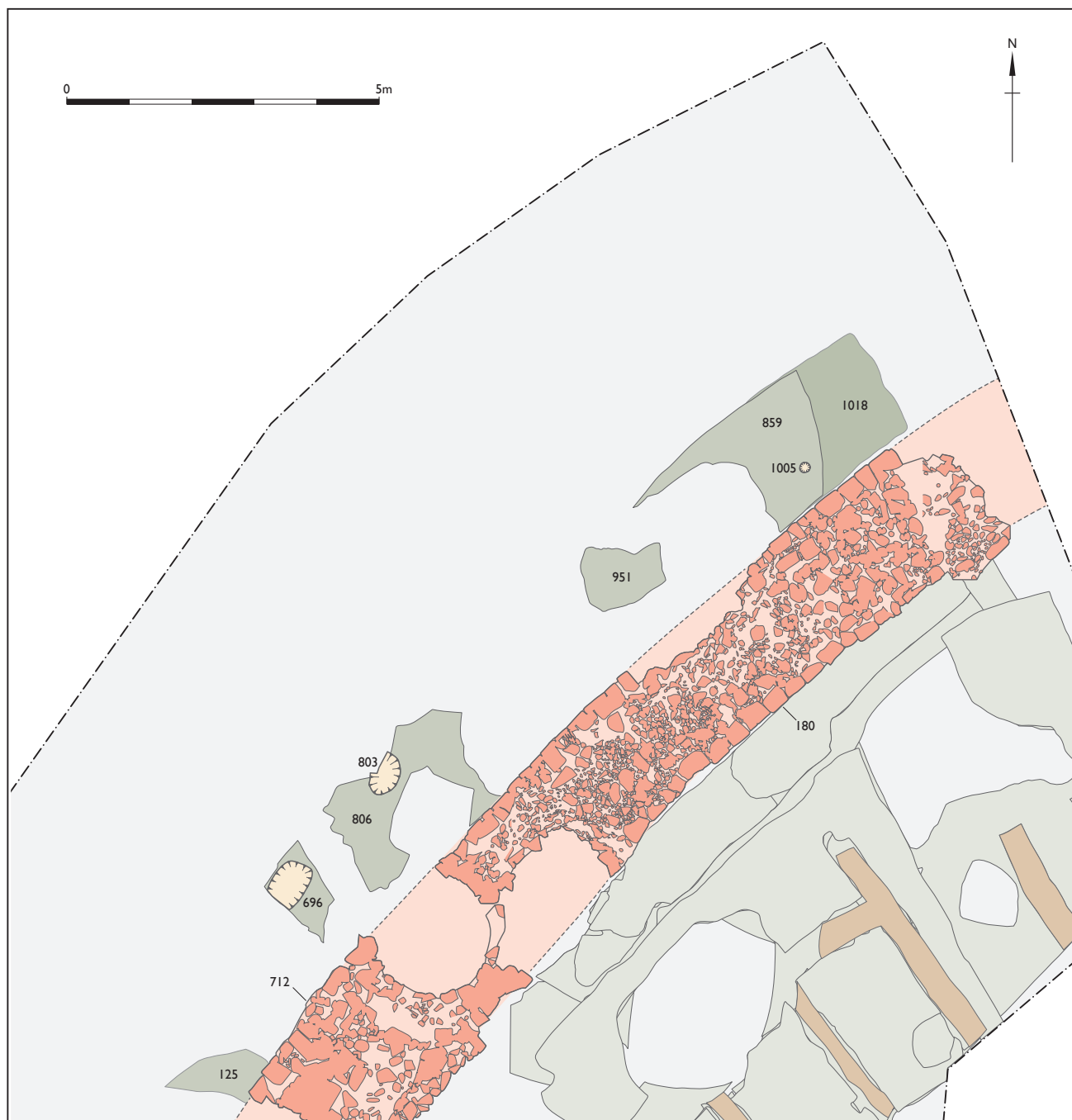


Fig 128 Plan of area outside Amphitheatre 1a to the north-east of Area A showing later deposits and features.

Trench X (Fig 59)

In Matthews' Trench X deposits of silt and sand of identical description to the deposits in Area A were found. A report on these deposits was prepared (Terra Nova 2003) in order to establish whether these deposits were water-lain. The report was inconclusive. In Trench X these deposits (Fig 138; contexts M297, M316, M346, M347, M355, M356, M429, M441) were cut both by the robber trench of the outer wall of the first amphitheatre (M319), and by one of Thompson's trenches (M 388). Beyond these deposits,

and cut by the construction trench for the outer wall of the second amphitheatre was a fine metallised surface (M442: Figs 59 and 165).

Trench 1X/X1

In Matthews' Trench 1X/X1 a pit (M225) cut sands (M226). The fills of the pit (M224, M213, M285, M286, M287) were in turn cut by the side-wall of Amphitheatre 2, Entrance 3 (Fig 185).

Trench 47

To the south-west of the amphitheatre the cleft of Souter's Lane seems to have functioned as a general dump. It is possible that an attempt was being made to level at least part of it. The stratigraphy of part of this feature was recorded in Trench 47 (Fig 28). At the base of the recorded sequence was a layer of yellow-brown sand which may have been naturally deposited (G163). This was cut by a post-hole (G165), and deposited on top of (G163) was a complete

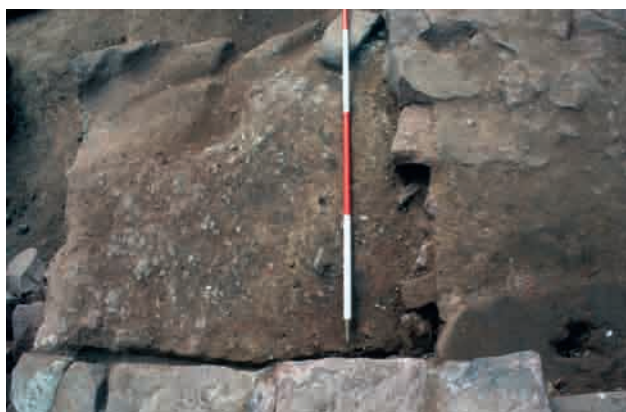


Fig 129 Laid pebble surface (723) within build-up of sand deposits.

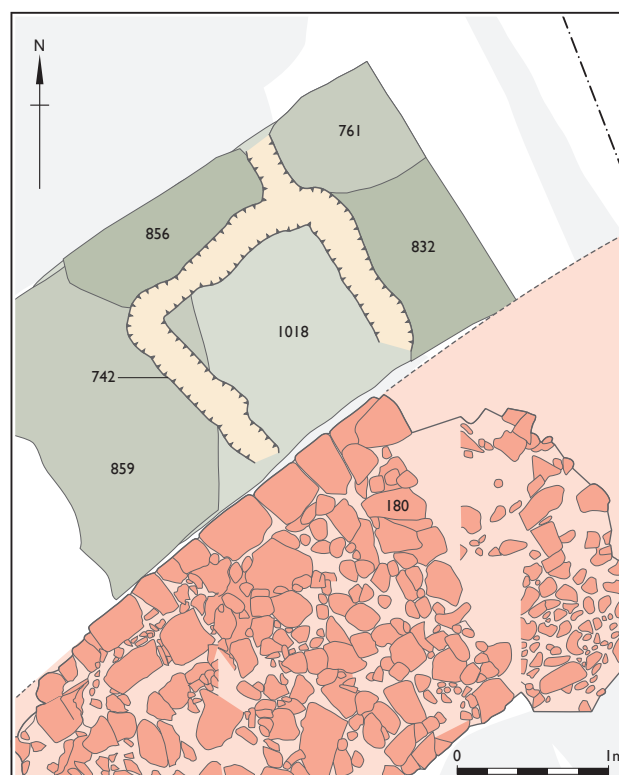


Fig 130 Plan to show timber slots of the first phase of the shrine.



Fig 131 The stone shrine, showing the white plaster on the lower part of the walls.

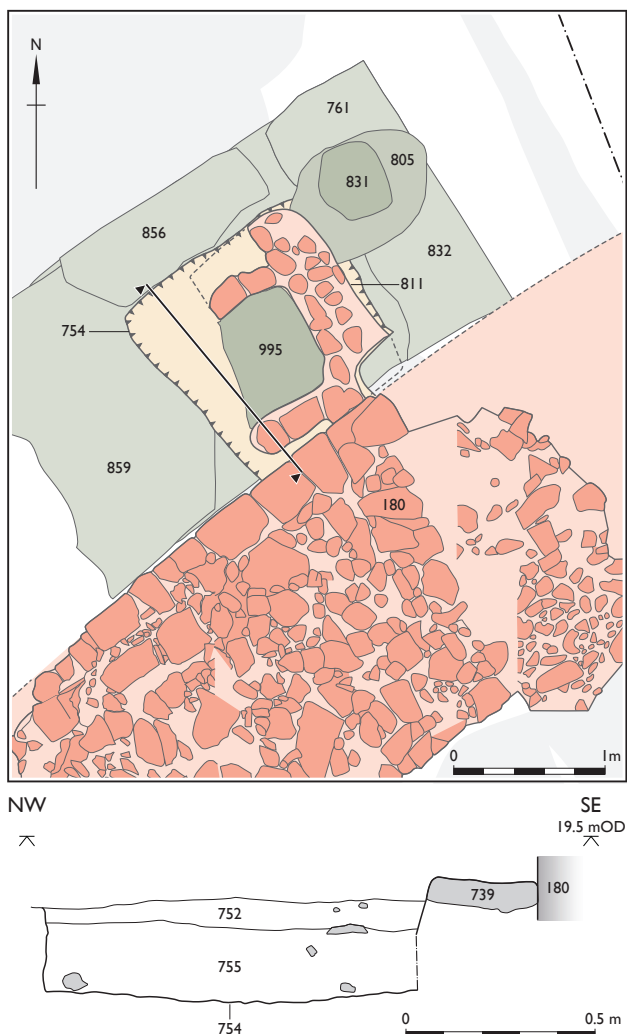


Fig 132 Plan and section of the stone shrine structure.



Fig 133 Upper sand layer of stratigraphic island.

cattle skull, which appears to have been deliberately placed on the base of the hollow prior to the deposition of an overlying deposit of red-brown sand (G162/166), which had formed to a depth of *c* 0.8 m.. These deposits contained pottery suggestive of a date *c* AD 120–150 (Dunn 2001a).



Fig 134 Section through deposits revealed in section of vomitorium robber trench (see Fig 79, section S6091).

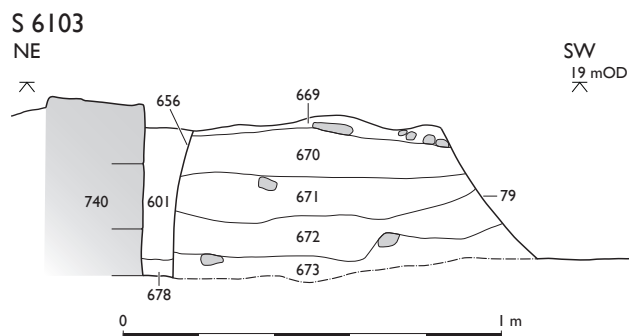


Fig 135 Section through deposits cut by vomitorium wall. As well as the deposits and the construction trench for the vomitorium wall shown in the drawn section, the photograph shows the gap and clumsy offset caused by the junction of the wall (711) and the earlier stone blocks (740) in the left foreground. Cut (656) is the construction trench for the vomitorium wall.

Above this lay a series of tipping layers containing large quantities of domestic refuse (Fig 28, G160) and deposits above). These deposits and features were dated by pottery to *c* AD 150–200. This suggests a continuous process of dumping into the ravine in the 2nd century.

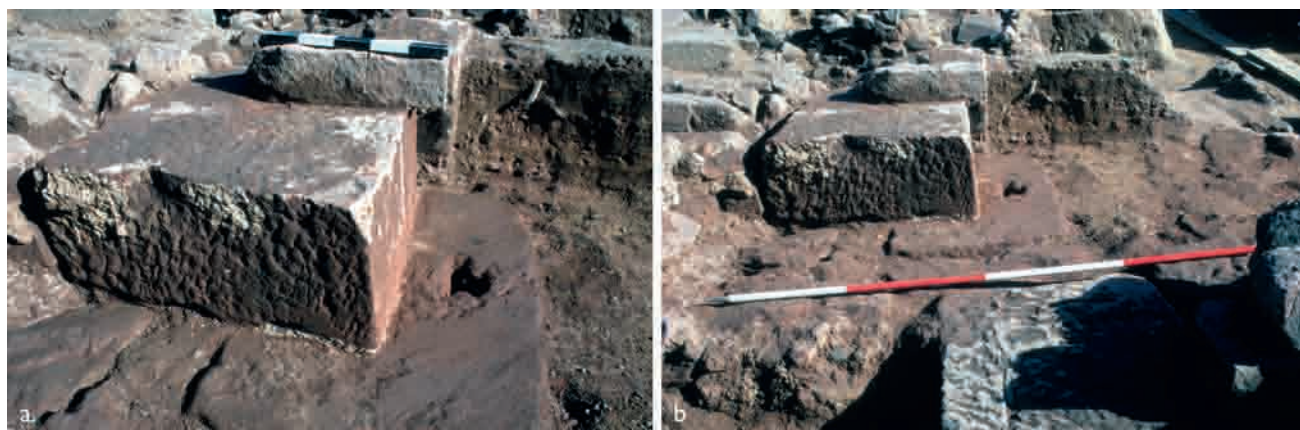


Fig 136 Early stone structure (740) and its relationship with the vomitorium wall (711). (a) shows the *f* at base and single surviving stone of the early structure. It is clear that the vomitorium wall is built up to and over this stone, leaving an odd offset around it in the wall face. (b) is a broader view which additionally shows how the upper block was incorporated into the corework of the vomitorium wall.

Finds and dating

By Gillian Dunn, Alison Heke, Quita Mould, David Shotter, Margaret Ward and Tony Wilmott

The finds from this phase are all from the deposits around Amphitheatre 1b in Area A. A single coin (CO7) dated to AD 69–79 from one of the sand deposits (698) was clearly residual given the dates of Phase 6 above. The various deposits, most of which comprised dumps of different kinds, produced fragments of copper-alloy sheet, strips, tacks and a ring (Func Cat no 245). A large assemblage of lead, consisting only of waste, sheet, strips, offcuts and unidentifiable pieces, was also recovered. An iron-hinge fragment was found on the road surface (1028) (Func Cat no 132). Forty-five fragments of glass were recovered from this phase; 39 vessel fragments and six window. The only identifiable vessel forms are bottles, including mid 1st–2nd-century prismatic forms. Blue-green, pale green, light green, yellow-tinged colourless and colourless vessels are represented. Coarse wares again date to the late 1st – early 2nd century. Most of the samian ware from contexts of this phase comprises small scraps (p 256). The latest such material was Central Gaulish sherds from Les Martres-de-Veyre made within the range *c* AD 100–120/125. These are the latest closely datable objects from this Phase, and as such provide the best *terminus post quem* for the construction of Amphitheatre 2.

1,860 fragments (23,521 g) of Roman CBM were retrieved from twenty-four contexts. This comprises the second largest group, in terms of weight, and the third largest group, in terms of fragment count, from the Roman-phased assemblage. As with the preceding phases, the majority of fragments are small and indeterminate. However, a range of identifiable forms was also recovered. These mainly comprise roof tiles and fragments of brick, with small numbers of box-tile. Two antefix fragments were also recovered and a single piece of *cuneatus* (solid

voussoir); the latter from (745). These wedge-shaped bricks were used in the construction of arches.

In terms of faunal remains, these contexts contained very much the same kind of assemblage as the contexts of Phase 5 associated with the use of Amphitheatre 1a, but in less quantity. The decline in quantity and the nature of the deposits make it more likely that this material was associated with the use of the amphitheatre than is the case for the earlier phase (especially (625)) which seems to be the result of general dumping. Particularly interesting in this respect is the unusually high quantity of bones of domestic fowl (p 409; Table 122) and oyster shell.

South and west of the vomitorium

The widespread dump sealing the road edge and around the wall of the amphitheatre (899) produced 86 sherds (656 g) of pottery including grey ware square and rolled-rim jars, white-slipped and orange ware vessels, southern Gaulish amphorae, part of the rim of a Wilderspool mortarium and one sherd of Chester/Foregate Street misfired grey ware. (p 294). All of this material dates to the later 1st and early 2nd centuries. The fills of the three post-holes against the outer wall of the amphitheatre and their associated floor surface also produced material dating to no later than the late 1st/early 2nd century, as did the material sealing these short-lived structures, successive episodes of dumping and the layer that sealed all these dumping episodes (555). This context and (841) produced fragments of a Domitianic-early Trajanic samian bowl (*c* AD 80–110).

North and east of the vomitorium

Two significant assemblages of pottery from this phase were from the islands of stratigraphy between areas of later disturbance. These islands, comprising primarily dumped sand deposits (669, 671, 672, 673 and 125–135), produced 180 sherds (1,294 g) of pottery (p 295). Holt orange ware,



Fig 137 Plan of the relationship between the early structure (740), the amphitheatre and the early road.

grey, white-slipped orange and black-on-brown wares are all present. There was also a Wilderspool oxidised bowl, an orange-ware beaker with white, barbotine stripes, a black-on-brown lid, white-slipped orange flagon and southern

Spanish amphorae, including both Dressel 20 and Cadiz types. Amongst the fine wares were white eggshell-ware, Lower Rhineland black colour-coat vessels, Holt orange mica-dusted ware and three vessels in black-surfaced

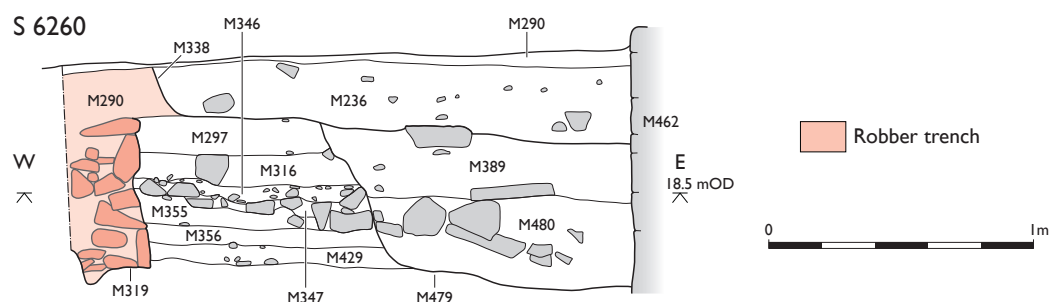


Fig 138 Section in Matthews' Trench X (for location see Figs 59, 162) showing sand deposits and surfaces cut by the robber trench of the outer wall of Amphitheatre 1b (M319).

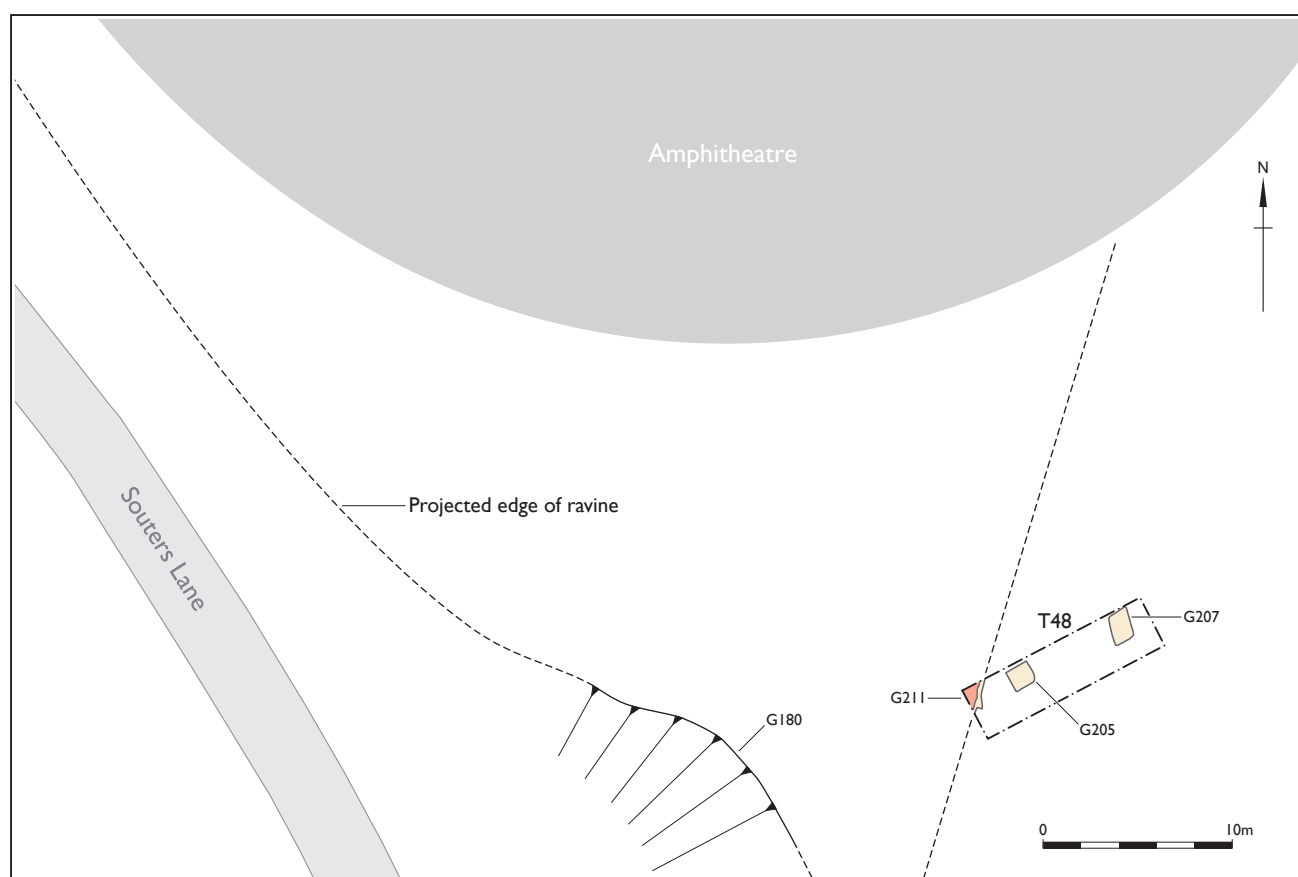


Fig 139 Features excavated to the south of the amphitheatre.

fabrics including a platter and a jar. The only recognisable small finds from these deposits, a copper-alloy toilet spoon (Func Cat no 137) and a fragment of a bone sword grip typical of the 1st-2nd centuries (Func Cat no 6) were recovered from the sand deposit (126).

Shrine

The lenses and bands of silty material, deposited during the use of the shrine produced 59 sherds (366 g) of pottery, of which 44 belonged to just two vessels (p 295). These were a beaker in a hard fine grey fabric, with a small everted rim

and a flat base (Pot Cat no 62, Fig 275), and part of the wall of an orange mica-dusted carinated vessel, possibly a beaker or flagon. The remainder comprised oxidised (including Severn Valley ware), reduced and white-slipped orange flagons and jars, and two body sherds of Dorset BB1. There was nothing in these assemblages to suggest a date later than the early 2nd century, the latest possible date being provided by the Dorset BB1 which is conventionally dated to AD 120+ (but see caveat below, pp 157–8). A Flavian samian ware cup of form 27 was found in fragments in these contexts (Sam Cat no 39). Eight fragments of vessel

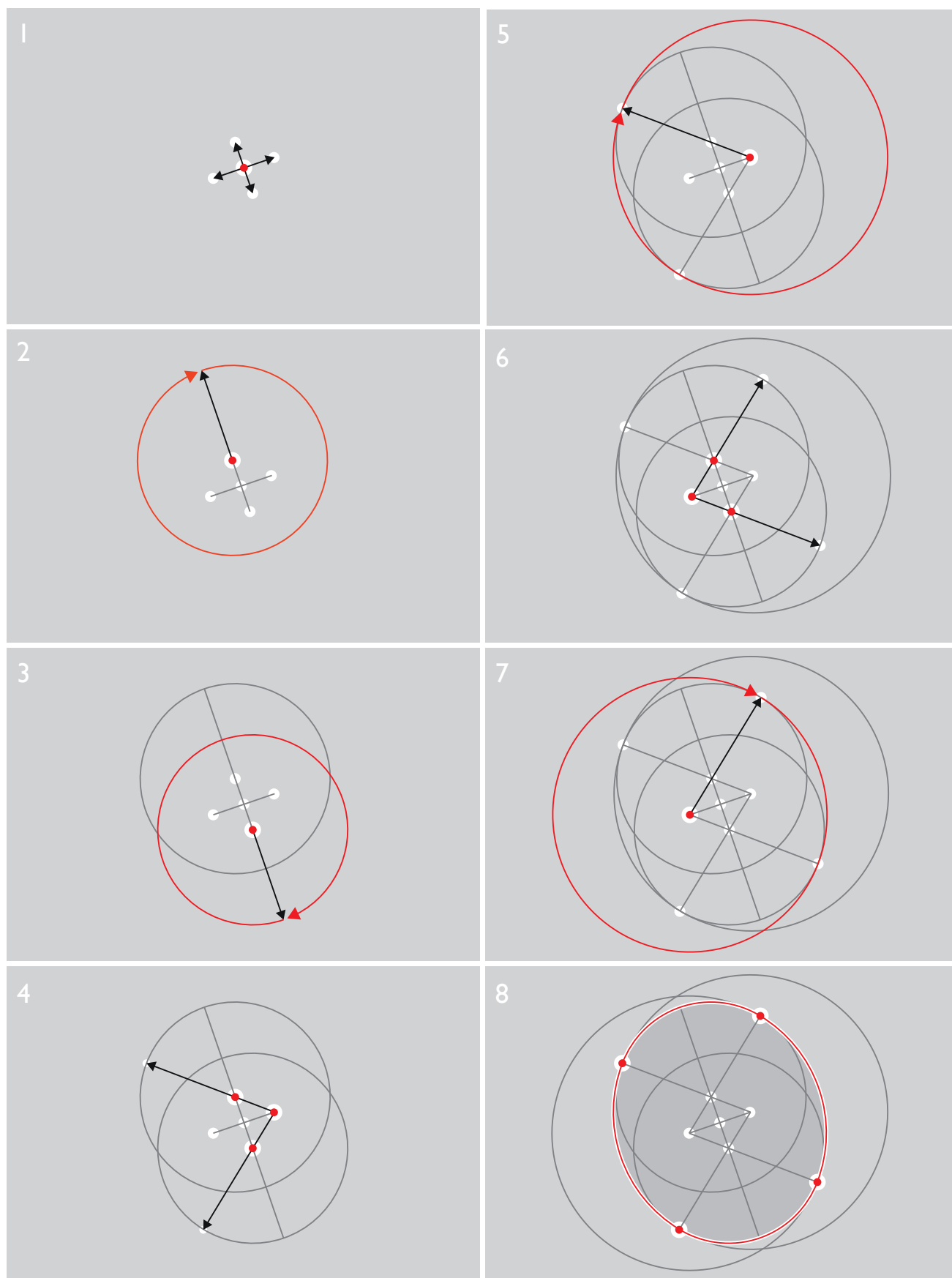


Fig 140 Sequence of actions required to lay out an oval arena.

glass and two possible fragments of window were also recovered from the shrine, as were seven fragments of waste and two of sheet lead.

Trench XI

The deposits found in Pit (M225), lying outside Amphitheatre 1 and cut by the side-wall of Amphitheatre 2 Entrance 3 (Fig 185), included in (M224) a group of samian ware with a stamp dated in the range AD 65–110 on a dish that was made probably before *c* AD 85 (Appendix 3).

Trench 48

The fills of pit (G205) produced a range of pottery manufactured at the Holt military depot (*c* AD 90–135), a mortarium from Verulamium (*c* AD 80–110), and South Gaulish samian ware of mid/late 1st century-date. The upper pit-fill (G202) was sealed by a lens of black charcoal-rich clay-silt (G200), which had slumped in to the top of the pit during settlement of the backfill. The pottery recovered from this lens was again dominated by Holt orange and grey wares, as well as a South Gaulish samian ware bowl (Drag 37) (Dunn 2001a).

THE FIRST ROMAN AMPHITHEATRE: DISCUSSION

Survey and layout

By Julian Baum and Tony Wilmott

Although the site chosen for the amphitheatre was a virgin site as far as buildings were concerned, it was not a virgin landscape. On the contrary, the amphitheatre was imposed

upon agricultural land bearing the corrugations created by cord-rig agriculture (above p 47), and there may also have been field boundaries on the site. The survival of the cord-rig earthworks beneath the seating bank shows that the site was not subjected to further levelling prior to the construction of the amphitheatre, and therefore that the existence of the earthworks was not an impediment to the surveyors who laid out the shape of the amphitheatre on the ground. A determining factor for the location must have been the existence of the Souters Lane ravine.

A major challenge in the architectural interpretation of amphitheatre buildings is the analysis, by reverse logic, of the method used to lay out the shape of the building, and there is now a substantial literature on these issues (*inter alia* Wright 1929; Golvin 1988, 387–95; Hallier 1990; Wilson Jones 1993; 2009; Duvernoy 2002; Ziebart *et al* 2007). A key discussion is whether amphitheatres were set out as ovals or as ellipses, and this issue has been tackled specifically by Wilson-Jones (2009). There is a clear distinction between the two shapes. The ellipse has two focal points on its long axis, and is a shape whose curvature is ever changing. Importantly for our purposes this means that it is by no means a simple matter to create parallel or concentric ellipses (Wilson Jones 2009; pers comm Myriam Fincker). The oval on the other hand is a constructed figure which is created by combining arcs with different radii but sharing common tangents (Wilson Jones 2009, fig 2.2). The simplest oval can be constructed using four arcs drawn from four focal points which are the centres of the circles of which the arcs form a part. These centres are arranged symmetrically as pairs on the long and short axes. Recent research has shown that amphitheatre layouts based both upon ovals and ellipses exist. In a sample

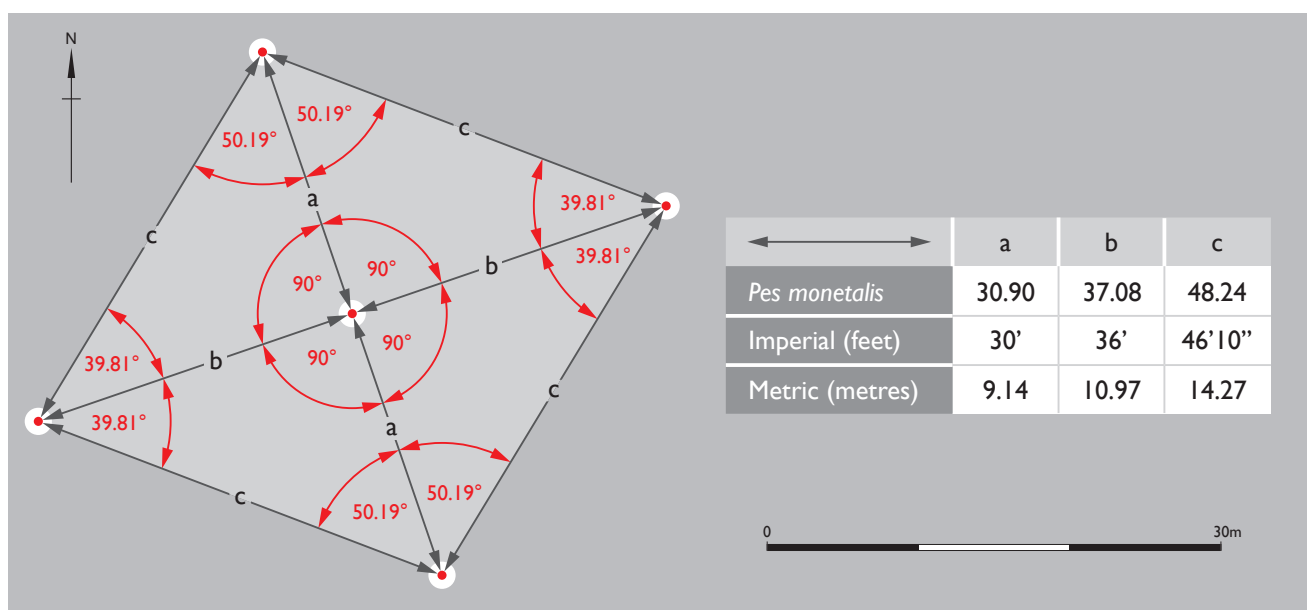


Fig 141 Focal triangles in the centre of the survey of the arena (measurements in *pM*).

of seven amphitheatres in the Rhine and Danube *limes* studied by Hallier (1990) both schemes were identified, with no model used twice. Four-centre oval layouts have been deduced in many amphitheatres, although the exact methods and proportions can be seen to vary on a site-to-site basis (see *inter alia* Wright 1929 (Caerleon); Lezine 1960, 44–46, fig 4 (El Djem (*Thysdrus*; *Africa Proconsularis*), Tunisia); Sunter 1976 (Chester, though working with the ‘stone amphitheatre’ postulated by Thompson); Fulford 1989

(Silchester); Bridel 2004 (Avenches (*Aventicum*; *Germania Superior*), Switzerland); Domergue *et al* 2006, (Purpan-Ancely, Toulouse (*Tolosa*), France).

Both the elliptical and oval methods were known to the Roman surveyors (*agrimensores* or *gromatici*). The construction of ovals by the use of four circles to create arenas is specifically mentioned by the surveyor Balbus in his manual of geometry, the *Expositio et ratio omnium formarum* (105.1) where he refers to *harenae ex quattor*

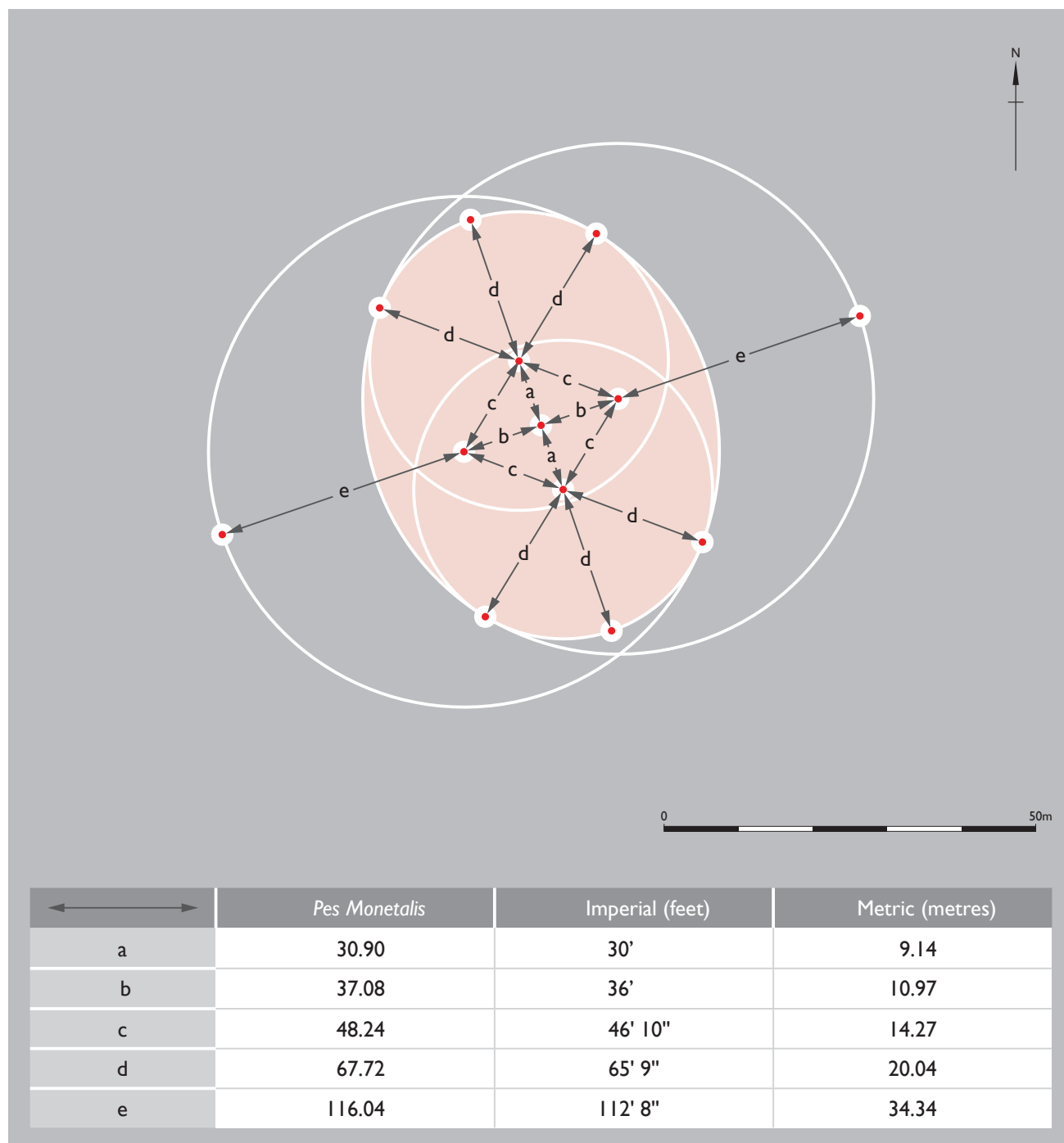


Fig 142 Measured reconstruction of the survey scheme for the arena.

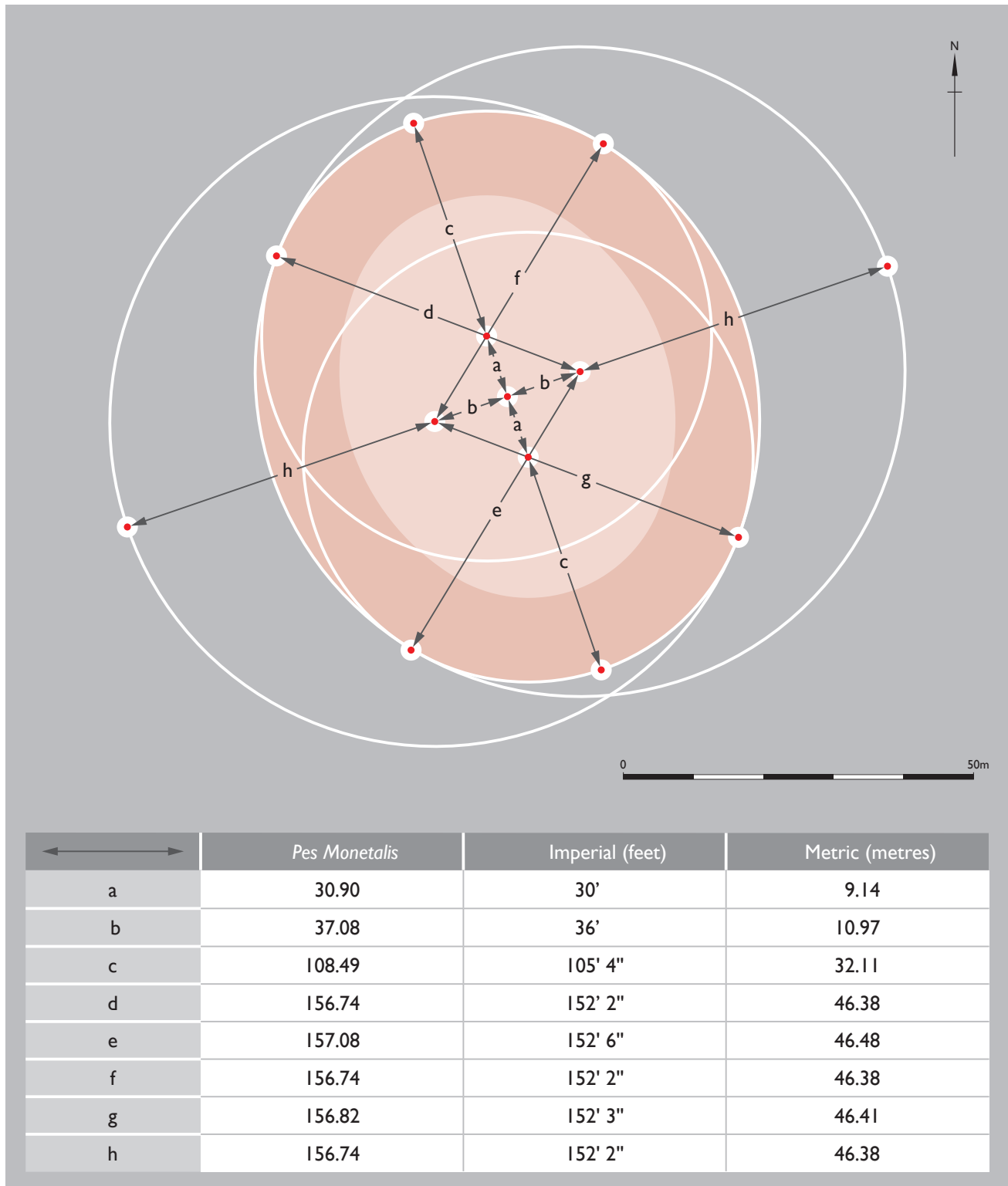


Fig 143 Measured reconstruction of the survey scheme for the outer wall of the first amphitheatre.

circulis. Balbus himself records his service in Dacia. This could either have been during the campaigns of Domitian (AD 86–7) or those of Trajan (AD 101–2, 105–6), though the latter is favoured by scholars (Folkerts 2008). He was

therefore a military surveyor working relatively close to the time of the construction of the amphitheatre at Chester.

At an early stage in the preparation of the present project it was assumed that the amphitheatre was elliptical, but as

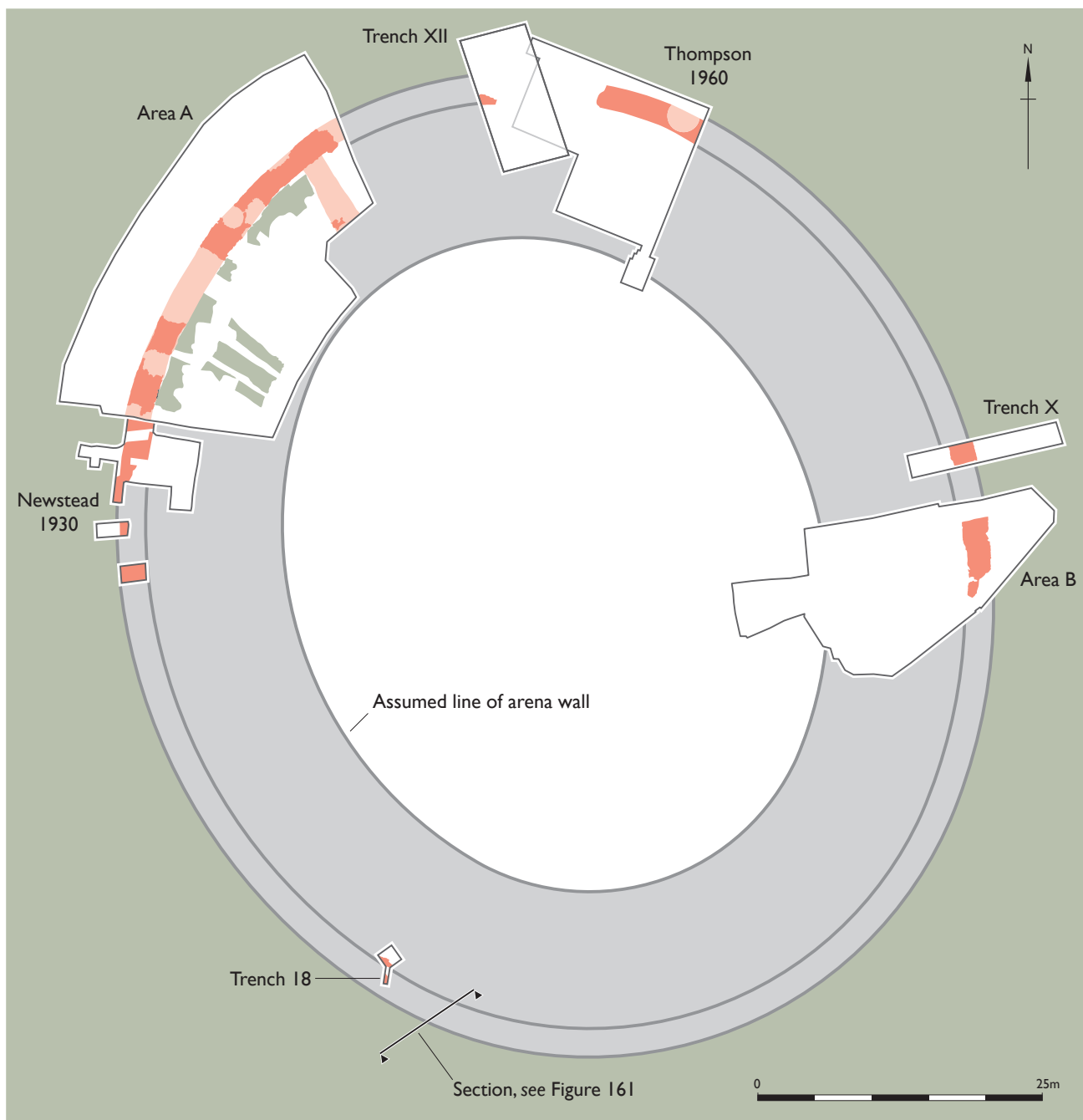


Fig 144 Plan of Amphitheatre 1a showing all elements excavated.

the project developed, and more accurate measurements were made of surviving fabric it became clear that the amphitheatre did not conform to an elliptical plan, and no computer-generated ellipse would fit the excavated evidence. The width of the *cavea* of the amphitheatre is furthermore constant, the outer and arena walls being concentric to each other; a major issue for ellipses (but see Golvin 1988, pl lxiii). Our analysis has conclusively shown that Amphitheatre 1a was laid out using the four-circle, oval method.

An additional issue in reconstructing the survey method is to attempt to identify the unit of measurement employed.

In Figs 142, 143 and 210 measurements are cited in Roman feet (*pes Monetalis*), imperial feet and metric to allow for conversion. Roman measurements in the planning of towns and military installations have been widely discussed (eg by Walthew 1978; 1981; Duncan-Jones 1981; Millett 1982; Bridger 1984), and Mason (2012, 53–59) has worked out survey schemes for the layout of the Chester fortress based upon the *pes Monetalis* (*pM*), and specifically for the Elliptical Building in the same unit (Mason 2000a, 35). Our calculations have been based upon this unit where 1 *pM* = 11.65 imperial inches = 0.296 m. Our calculated distances

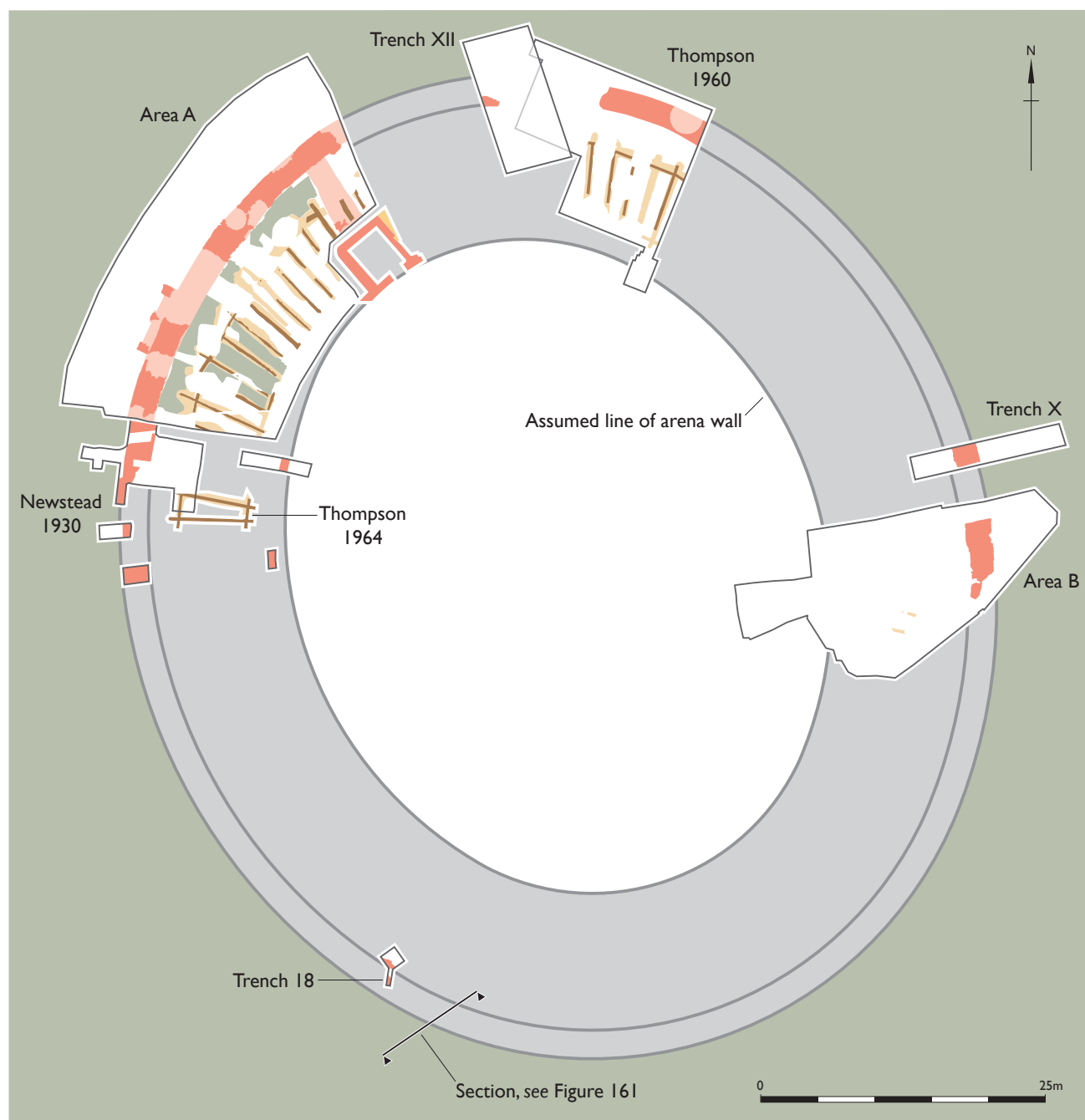


Fig 145 Plan of Amphitheatre 1b showing all elements excavated.

do not come out to exact values of pM , although there is a marked tendency for measurements to equate rather closely to whole, half or quarter pM . It should be remembered that our calculations are based on exact measurements and the use of a computer. Slight deviations from whole numbers and exact angles are the result of the nature of the survey method and the uneven ground, and are insignificant, as they would be well within acceptable tolerances for such a large-scale project. Layout would have been carried out by the use of the surveying tool known as a *groma* which would have established preliminary angles and alignments

(Lewis 2001, 124–33; Fincker *et al* 2014). Circles based upon the alignments would then be laid out using lines and fixed pegs.

Figure 140 shows the basic sequence for laying out an oval. The first oval to be measured would have been that of the arena. The first stage in planning was the establishment of the major long and short axes, and of a focal triangle connecting the focal points and the crossing of the axes (Fig 140.1: Wilson Jones 2009, fig 2.5a). The focal triangles in the centre of the arena are illustrated in Fig 141. The interior angles of the triangle are clearly intended to be 90°: 50°:

40', the east-west side 37 *pM* and the north-south side, 31 *pM*. The hypotenuse would ideally measure 48.27 *pM* ($37^2 + 31^2 = 2330$; $\sqrt{2330} = 48.27$), and the actual measurement is 48.24 *pM*. The points on the ends of the hypotenuses of the central triangles became the centres of the four circles from which the oval was constructed. First the two circles that lay along the long axis were drawn (Fig 140.2, 140.3). The centres of the large circles that created the curve of the sides of the oval were then drawn from the centres on the short axis, such that these circles shared a tangent with the inner circles (Fig 140.4–140.7). The oval combined the curves of all four circles (Fig 140.8). The measured scheme for the arena is shown in Fig 142, while Fig 143 demonstrates the measurements of the parallel oval for the outer wall which must have been laid out from the same centres as the arena, but with larger diameter circles.

Outer wall and *cavea*

Figures 144 and 145 compare our knowledge of the features of Amphitheatres 1a and 1b that have actually been excavated. There have been only seven, scattered observations of the outer wall, which has been recorded by Newstead, Thompson, Matthews, Buxton, and in our Areas A and B. The place of the wall in the structural history of the building was first recognised in Area A, and it has been possible to interpret earlier findings, particularly those of Matthews, in the light of this. The sequence of construction is unambiguous. In Phase 4 the outer wall was built first. The spoil from the excavation of its foundation trench was deposited in a bank inside the wall line. The arena was then excavated, probably to the top of red natural sand deposits, and the clean upper soils excavated from the arena were piled against the inner face of the outer wall, adding to the spoil dump from the excavation of the foundation. This phenomenon has only been recorded in the northern *cavea*; the clean natural materials were not present in Area B, indeed there may not have been any primary banking in this area, or generally on the south side of the building.

There are real problems with the interpretation of

Amphitheatre 1a as a completed and functional structure although, as shown above, there is evidence to indicate that it was actually used in Phase 5. The arena never varied in size throughout the history of the building – it retained the plan and dimensions laid out in the initial survey (albeit somewhat distorted on the east side during the building of Amphitheatre 2 (p 190)). If the upper layers of soil only were excavated from the arena in this phase it provides two interpretative problems; the arena would be very shallow, and there would have been nowhere near enough spoil deposited in the *cavea* to create a seating rake. Where the primary bank of clean redeposited material against the outer wall survived to a height of 0.95 m (Fig 74, S6091) it seems likely that this was its maximum height. Without some form of free-standing seating it would have been impossible for spectators to see into the arena, and the arena was so shallow that a wall, or perhaps a timber palisade, would have been needed to protect spectators. There is no evidence for either of these. Though a timber arena palisade would have been destroyed without trace when the stone arena wall was built, there would surely have been some archaeological trace of timber seating in this phase, and there is not.

The issue of the possible height and volume of any potential earthen seating bank is brought into focus when considering the Phase 6 bank of Amphitheatre 1b.

The primary bank was cut by the level terrace created for the timber seating framework of Amphitheatre 1b. The timber-frames were held in place by further redeposited material. In Area A this comprised red gritty sand and sandstone derived from the lower natural rock deposits, which was spoil thrown up from the deepening of the arena down to the level of solid bedrock. In order to create this terrace the primary seating bank material removed from the *cavea* must have been dumped into the arena and then put back when the timber seating had been built and the arena deepened. Thompson (1976, 161–2) attempted to reconstruct the volume of material excavated from the arena and disposed of as a seating bank. We can now replicate Thompson's calculations with our updated amphitheatre dimensions as follows:

Arena area	= πab where a and b are semi-axes = $3.142 \times 29.18 \times 22.65 = 2,076.63 \text{ m}^2$
Volume excavated from arena	= $2076.63 \text{ m}^2 \times 1.52 \text{ m arena depth} = 3,156.48 \text{ m}^3$

The overall area of the *cavea* is calculated as follows:

Amphitheatre 1b overall area	= πab where a and b are semi-axes = $3.142 \times 41.25 \times 31.86 = 4,129.29 \text{ m}^2$
Amphitheatre 1b <i>cavea</i> area	= (overall area of amphitheatre) – (arena area) = $4,129.29 - 2,076.63 = 2,052.66 \text{ m}^2$

Given the area of the *cavea* and the volume of spoil available from the excavation of the arena, it is possible to calculate a theoretical height for the seating bank if *all* the spoil from the arena *alone* was spread between the arena and outer walls to a consistent depth:

Spoil volume / cavea area = 3,156.48 / 2,052.66 = 1.54 m depth of bank

These calculations take account of the volumes of the exterior and arena walls, but do not take account of variations around entrances, which remain unknown. The calculations do, however, include the material piled against the outer wall in Phase 4 which formed the seating bank of Amphitheatre 1a.

Even with the timber-framed seating set at 27° (see p 155) rising from the arena wall, the depth of spoil beneath the seating at the rear wall could not exceed 1.8 m if evenly spread. This quantity of spoil and potential bank height was clearly considered inadequate, leading to the importation of further material. The banking in Area B, which survived to a height of 1.7 m in some places (Fig 104) was composed partly of artefact-rich mixed deposits and partly of clean, redeposited, natural material. It seems clear that the banks were provided to give extra stability to the timber-framework by burying the base-plates and the lower parts of the frames. Although we cannot know what depth of material was considered desirable for the purpose, the evidence from Area B shows that the spoil from the excavation of the arena was not sufficient, that more material had to be imported to finish the job, and that this material was taken from occupied areas of the fortress and *canabae*. A similar situation appears in the London amphitheatre, where extra material including a quantity of smithing debris was incorporated into the banking (Bateman *et al* 2008, 28).

As we have seen, the timber-framed seating of Amphitheatre 1b was misunderstood by Thompson. In the excavation report, Nigel Sunter (1976) undertook a detailed structural reconstruction based upon the evidence then available. Although an excellent piece of work, this was based on a series of false premises which now render it redundant. The first of these was that the timber framing formed part of a free-standing, framed amphitheatre entirely built of timber. This would have included a timber outer wall and a timber arena wall, all of which would need to be locked together by sophisticated jointing. Elsewhere entirely timber built amphitheatres certainly existed, having recently been studied in the first phase of Xanten (*Colonia Ulpia Traiana; Germania Inferior*), Germany (Müller 2008), at the auxiliary fort of Künzing (*Quintana; Germania Superior*) Bavaria (Schmoltz 2006) and at Stari Kostolac (*Viminacium; Moesia Superior*), Serbia (Bogdanović and Nikolić 2017, 91). In the latter case radial timber beams similar to those at Chester were identified, and the reconstruction proposed is strikingly similar to that of Sunter (Bogdanović and Nikolić 2017, figs 10–12).

Sunter further assumed that the timber structure was built upon flat ground, with an arena defined by his timber arena wall, but not dug into the ground. He worked on the basis that there were no diagonal braces provided between the base-plates and the uprights, as Thomson did not notice or record these features (above, p 92), and therefore had to come up with a complex bracing system within the upper, lost parts of the framing. Finally, Sunter provided *vomitoria*, or access stairs within the framed structure beneath and emerging into the seating. He considered that the upcast material around the timber-frames belonged to a phase of demolition and the later excavation of the arena during the construction of the ‘stone amphitheatre’.

Given the fact that the arena demonstrably was excavated into the ground for Amphitheatre 1a, and that the timber framing occupied an area between stone walls, we are able to propose a far simpler reconstruction (Fig 146).

The evidence shows that the primary seating bank was cut away to form a flat terrace on which to construct the timber framework. The spoil from this operation must have been deposited in the arena, from where it could be redeployed to hold the timber framing in place. The individual radial timber-frames would then have been prefabricated using ash and beech timber which was sawn to size and shape (p 118), erected in prepared beam-slots, and jointed to laterals at a higher level. The fact that nails were driven into the underside of joints (Fig 95d) provides convincing evidence for the prefabrication of the frames. The relationship between the radial timber-frames and the ring-beams is shown in the case of Radial timber-frame 15, where the frame was housed in the Outer Ring-beam with a cross-halving joint (Fig 100a), which in this case at least required the additional provision of wedges within the joint (Figs 100k, 147).

Combining evidence from the best preserved examples, Radial timber-frames 11 (Fig 91), 13 (Fig 95) and 15 (Fig 99,) it is possible to show that each frame comprised an inner upright, two central uprights, each of which were provided with a diagonal brace, and an outer upright which lay outside the line of the Outer Ring-beam (Figs 73, 146). Table 12 summarises the scantling of all of the timbers whose dimensions could be established. Though the sizes of the casts vary, there is sufficient similarity to believe that consistently sized timbers were in use, although the original unit of size cannot be reconstructed. As Sunter (1976, 227) pointed out, there is clear evidence that the uprights were housed in mortices cut in the tops of the base-plates. The same is not true of the braces, however. Although these rose from the base-plates, in the two cases where evidence survives, it is clear that the braces butted the uprights, and that these elements were not jointed, but placed face-to-face and nailed (Radial timber-frame 11, Fig 92c; Radial timber-frame 15, Fig 100j). As the base-plates were wider than the uprights, the braces would have to have been jointed in some way to the base-plate. The

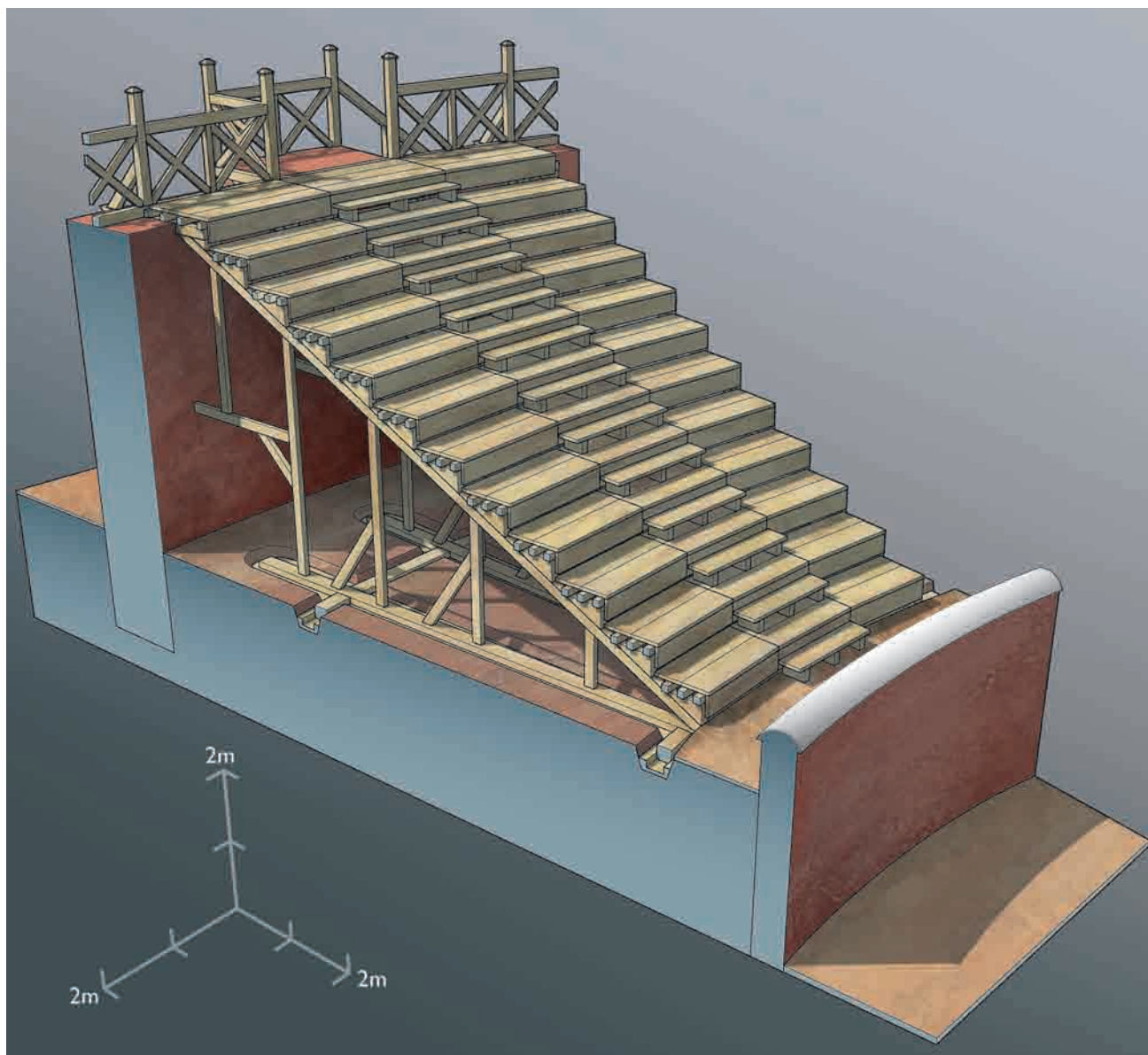


Fig 146 Reconstruction by John Vallender of a segment of the stone shell and timber seating of Amphitheatre 1b.

simplest explanation is that the bases of the diagonal braces were lapped over the base-plate with a simple birdsmouth joint (a solution also proposed by Sunter (1976, 227) for the upper works of his proposed timber amphitheatre). The alternative is that the end of the brace was cut into the base-plate and this seems to lend greater strength to the joint. In Timber-frame 11 there is evidence that this joint was pegged (Fig 91d, p 108). Fig 147 combines the evidence from all frames where evidence of joints, wedges, nails and pegs was recovered from the timber casts. This illustration assumes that the method used was consistent.

An important question relates to the height of the stone outer wall – a question that also relates, of course, to Amphitheatre 1a. The only evidence we have that might address this is the stair foundation. External stairs, like those

from Chester are known at other amphitheatres, including at Pompeii and Paestum in Campania, Italy. The foundation for a timber external stair was found in London (Bateman *et al* 2008, 109). The lack of any extant stairs from which an angle of rise can be calculated is a problem (unlike in Amphitheatre 2, where surviving steps have proved to be the key to the analysis of the building, pp 198–200). There are a few examples elsewhere of surviving stairs in broadly analogous positions, where access to a wall-top is required. Perhaps the best known is at the Hadrian's Wall milecastle at Poltross Burn (Mc 48), where the angle of rise of a stair has long been considered the best evidence for the height of Hadrian's Wall (Breeze 2006, 287; Gibson and Simpson 1911). Here the length of the stair base is 4.85 m, and the calculation of the height of 3.66 m to the wall top is

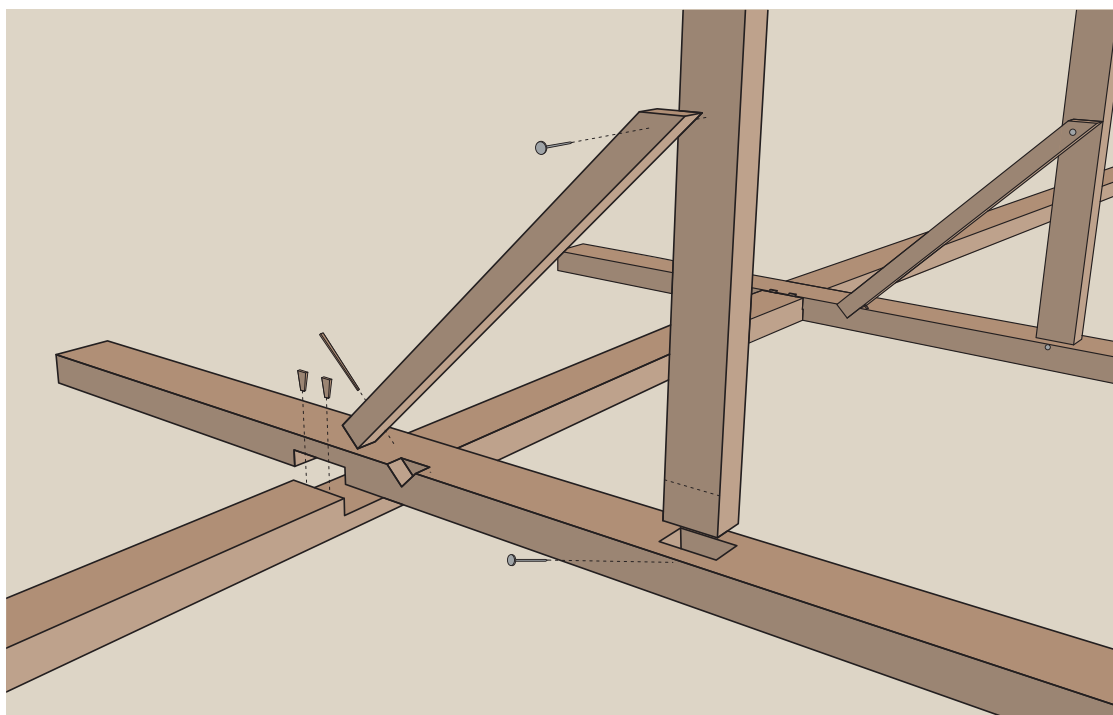


Fig 147 Expanded view of the jointing and fixing attested for the base elements of the timber seating framework.

Table 12 Summary table of the scantling of timbers recorded as casts.

Radial Frame	Base plate (m)	Upright (m)	Brace (m)
5	0.26 x 0.08		
8	0.22 x 0.10		
10	0.32 x 0.15	0.15 x 0.05 0.16 x 0.06 0.17 x 0.07	
11	0.23 x 0.17	0.20 x 0.12 0.18 x 0.08	0.13 x 0.13
12	0.24 x 0.12	0.19 x 0.08 0.15 x 0.08	0.12 x 0.18
13	0.21 x 0.08	0.18 x 0.12 0.14 x 0.08	0.13 x 0.08 0.10 x 0.09
14	0.28 x 0.09	0.15 x 0.09	
15	0.22 x 0.08	0.16 x 0.09 0.12 x 0.11	
Outer Ring Beam	0.26 x 0.15		

based upon an angle of rise of 37° measured over surviving steps. At the amphitheatre of Paestum, the original stone outer wall was later equipped with double brick stairways, providing access to the original wall top. The existence of a landing at the top of the two stairs would indicate that

they survive to full height. A single stair here is 5.76 m in length, and the wall is 4.35 m high, giving again an angle of rise for the stair of 37° (measured on site by TW 2014; Welch 2007, 232; Golvin 1988, pl xxiv). The well-known external stairs of the Pompeii amphitheatre rise at an angle of approximately 35–38°. These three examples, separated widely in time and space, have been taken to suggest a similar rise for the external stair at Chester.

In creating the reconstruction at Fig 146, John Vallender began with the timber-framework. The calculations suggested for the depth and height of individual seating rows in Amphitheatre 2 (pp 198–9) were then applied to reconstruct a viable timber seating structure without consideration of the wall height. The length of the stair base is 6.24 m. If an angle of rise for the stair of 37° is suggested, a simple trigonometric calculation gives a height for the outer wall of 4.7 m. This wall height was applied to the reconstruction, and was found to fit the projected seating rake of 27° with a margin of error of only 150 mm. An identical seating rake has been independently suggested for the timber amphitheatre at *Viminacium*, Serbia (Bogdanović and Nikolić 2017, 91). Figure 146 is therefore offered as a probable reconstruction of the structure of the timber seating and outer wall (though excluding both the terrace cut in the original seating bank and the banking beneath the timber-frames which held them in place). This reconstruction implies that the timber seating and outer wall are a single concept, with putlog holes in the wall to accommodate supporting timbers of the seating frames. If this is the case, it may be better to see Amphitheatre 1b not

as a refurbishment of a completed amphitheatre, but as the completion of one that had been only partially built in the earlier phase.

Entrances

The continuation of the outer wall across the site of the east entrance of Amphitheatre 2 in Matthews' Trench X proves conclusively that there were no entrances on the short axes of Amphitheatre 1. The only suggestion of the possible position of an entrance was the radial wall foundation close to the later north entrance on the eastern side of Area A. Although it appeared that the primary seating bank had been dumped up against a wall built in this trench, this observation was only made in a very small and highly disturbed area. The high level of the base of the foundation trench, together with the fact that the outer wall clearly continued beyond its line with no sign of an opening where the two walls met, shows that this could not have been the side-wall of a passage into the arena. Furthermore the radial wall was located well to the east of the point at which the passage into the arena would be expected, centrally at the end of the long axis of the arena. Given the lack of other entrances, it might be suggested that the north entrance was a complex structure similar to that suggested below for the main east entrance of Amphitheatre 2 (pp 202–4). It may be tentatively suggested that the radial wall was part of a side passage to the north entrance which afforded entry into the seating. Unfortunately if this was the case later modifications have removed any further evidence, though a fragment of the original entrance may survive in the later *Nemeseum* structure (p 126).

The *Nemeseum*

The addition of the *Nemeseum* logically belongs to Amphitheatre 1b. The complexities of its interpretation are discussed above. It seems likely that it was added as part of a remodelling of the north entrance to the arena, and the deepening of the arena. The different builds apparent in the consolidated structure are more likely to be episodes within the sequence of construction than phases separated in time.

It has been suggested that the original function of the *Nemeseum* might have been as a *carcer* or holding pen for animals. However, it only has one entrance – the door into the arena. If it was a *carcer* one might expect a rear entrance into which an animal might be introduced, and an exit into the arena. It would certainly not be possible to back an animal through the narrow door! The only way this could be used as a *carcer* would be to push an animal in a travelling crate through the door. To release such an animal, it would be necessary to open the crate from above by means of a sliding end to the crate. In London a *carcer* in an analogous position to the Chester chamber was provided with a rear entrance and a sliding door opening into the



Fig 148 *Nemeseum* altar as photographed by Thompson.

arena (Bateman *et al* 2008, 106, fig 107). A sliding door in a crate would be somewhat analogous; however, no very large animal could be accommodated. The use of crates for the movement of animals in imperial amphitheatres has been convincingly argued by Hufschmid (2007, 43/2, 485–90) in his reconstruction of the lifting systems at Pozzuoli (*Puteoli*), Italy

The alternative to the chamber as a *carcer* is simply that it was actually designed as a *Nemeseum*. It was identified as such by the discovery of an altar to Nemesis found in the chamber by Thompson. The altar (RIB III, 3149; Fig 148) reads:

DEAE NEMESI
SEXTI MARCI
ANVS > EX VISV

‘to the goddess Nemesis, Sextus Marcianus, centurion [dedicates this] as the result of a vision’. Similar dedications to Nemesis following dreams or visions have been found at the amphitheatre of *Sarmizegetusa* (*Dacia*), Romania, and in a secondary context at *Aquileia*, Italy (Hornum 1993, 266, no 200; 228, no 138).

The altar was found in a secondary context within the chamber following alterations which are now to be

associated with later periods (see Volume 2 of this report), however, it seems likely that it has not been moved far, and may well have been made for use in the chamber in its primary form.

The cult of Nemesis in relation to the games and the imperial cult has been reviewed by Hornum (1993), while Wittenberg (2014), has specifically examined the structure and location of *Nemesea* within amphitheatres. *Nemesea* are found either as independent structures outside the building or particular rooms within the amphitheatre, either built as, or converted into, shrines (Hornum 1993, 56–7). Many such structures have been identified through the discovery of fragments of statuary or inscriptions to the goddess. External *Nemesea* are most often located near a principal arena entrance, usually on the long axis (eg Sopron (*Scarbantia*; *Pannonia*), Hungary, both the civil and military amphitheatres at *Carnuntum* (*Noricum*), Austria, the civilian amphitheatre at Aquincum (*Pannonia*), *Flavia Solva* (*Noricum*), Austria, and *Sarmizegetusa*) (Wittenberg 2014)). At Caerleon, Wheeler and Wheeler (1928, 120) identified an external building at the north end of the long axis as a *Nemeseum* by analogy with the military amphitheatre at *Carnuntum*. The same parallel has led us to consider the painted structure outside the north entrance of Amphitheatre 1b (p 137) at Chester as a possible shrine. At a few sites (eg Mérida (*Emerita Augusta*; *Lusitania*), Spain, Pula (*Pola*; *Dalmatia*), Croatia, and *Italica* (*Baetica*), Spain, (Wittenberg 2014)), the dedications to Nemesis occur within an entrance passage. Unusually at *Porolissum* (*Dacia*), Romania, the *Nemeseum* is a chamber within the *cavea* accessed from outside the building (Alicu 1997, 60–68; Wittenberg 2014, 89, *abb* 47). *Nemesea* like that at Chester, accessible only from the arena itself, are attested at Tarragona (*Tarraco*; *Hispania Tarraconensis*), Spain, where a chamber 3.3 × 1.5 m on the north side of the short axis is accessible from the arena by way of two steps (Taller Escola D'Arqueologia 1990; Wittenberg 2014, *abb* 22), at Maria Saal (*Vimunum*; *Noricum*), Austria, also on the short axis (Wittenberg 2014, *abb* 15), and on the long axis at *Tipasa* (*Mauretania*), Algeria (Pichot 2012, 87–8).

Dating

Dating evidence from Phases 4 and 5 is sparse. The locally-made ceramics all have a broad mid-1st to early 2nd-century date range, however the two coins dating to AD 71 found in pre-amphitheatre deposits provide a *TPQ* for the building of Amphitheatre 1a. It is thus difficult to avoid the conclusion that the amphitheatre was part of the original conception of the fortress establishment. The stone construction of the amphitheatre is paralleled by the *horrea* and the fortress baths, the latter being completed between the years AD 72 and 79 (Mason *et al* 2005, 104–5). The amphitheatre also takes its place alongside the stone-founded, anomalous buildings in the fortress, namely the

Elliptical Building and the large courtyard complex behind it, even though, as noted above (p 6) these structures were not completed (and the completion of Amphitheatre 1a is also questionable).

For the phase of use of Amphitheatre 1a, following its construction but prior to the alterations of Phase 6, though the local wares still have the same broad mid-1st to early 2nd-century range as the construction phase, the closely dateable samian ware is all Flavian to *c* AD 100, with a marked bias towards the Domitianic (Sam Cat nos 11–14). This agrees closely with the three Domitianic coins, all coincidentally dating to a single year; AD 85. These coins come from widely separated contexts of this phase, but two of them are from contexts which stratigraphically pre-dated the construction of the external stair of Amphitheatre 1b in Phase 6.

A single coin was recovered from the lens of redeposited turf (886) in the packing above Radial timber-frame 8. This securely stratified coin (CO25) dates to the end of the reign of Domitian, AD 92–4, and there can be no doubt that it was deposited during the construction of the timber-framed seating. This coin is consistent with the three Domitianic coins of AD 85 from deposits of Phase 5. The dated samian ware from the Area B seating bank dumps gives a similar picture. Here the latest vessels were produced in the Domitianic to earlier-Trajanic range (*c* AD 80–110; Sam Cat no 22), although there were no products of definite, Trajanic (or later) date. Analysis of the ratio of samian moulded bowl forms 29 to 37 implies that the accumulation of samian ware from Amphitheatre Phase 5 and onwards occurred after AD 85/90, with evidence in Phase 6 pointing towards the accumulation of material some years after 85/90 (pp 230–32 for discussion). As far as earlier excavations are concerned, in 1964 a samian ware bowl of form 29 recovered 'from the seating-bank make-up', was said to be typically Neronian, dated *c* AD 50–65, and presumed to have survived long in use (Hartley and Morris 1976, 202), while the packing around one of the two post-holes recorded by Newstead and Droop (1932a; Fig 193) and which are associated tentatively with the timber framework, contained a samian stamp of Albanus ii, dated to AD 60–80 (Appendix 2).

This consistent pattern is slightly complicated by the presence in the packing for the base-plate of Radial timber-frame 11 of a sherd of Dorset BB1, and three further sherds of this pottery in the Area B seating bank. It is just conceivable that the sherds in Area B come from part of the seating bank enlarged during the construction of the second amphitheatre, but that from the base-plate cannot be intrusive. Traditionally the appearance of this material in Chester has been dated to AD 120+, contemporary with the mass importation to the northern frontier in the Hadrianic period. The adoption of this ware on the northern frontier, however has been shown to 'leap-frog much of the rest of Britain', making it difficult to chart its spread

in areas like the Midlands and North Wales (Holbrook and Bidwell 1991, 92–3). The date of the arrival of the ware on the northern frontier is a vexed one. It has been argued that it was in use on the Trajanic Stanegate, though this seems dubious (Holbrook and Bidwell 1991, 92; Caruana 1999). It has been shown that BBI appears in the southern parts of Wales in the Flavian-Trajanic period at Cardiff, Caerleon, Caerwent, Carmarthen, Gelligaer, Llanio, Loughor, Whitton, Neath and Abergavenney (Holbrook and Bidwell 1991, 92) and also in small quantity, again a single sherd in Flavian/Trajanic contexts, at Caernarvon (*Segontium*) (Webster 1993, 256). The recent publication of the pottery from the closely dated stratigraphic sequences in the Carlisle Millennium excavation demonstrate that small quantities of Dorset BBI were present in Period 3A dating AD 72/3–83/4 (Swan 2009, 601). As Swan points out, ‘these should not be seen as indicative of direct institutional provisioning, but are most likely to represent items carried to the site by troops transferred from other locations’. The consistent and overwhelming late Flavian ceramic and numismatic dates for the exterior deposits in Area A in Phase 5, and for the creation of Amphitheatre 1b in Phase 6 would tend to suggest that the reason for the appearance of small quantities of BBI in these phases at Chester, and at *Segontium* for that matter, was the same as for Carlisle.

In conclusion the finds evidence would seem to provide a firm context for the alterations of Amphitheatre 1b in the last years of the first century, perhaps around AD 100. Such a date would agree with Thompson’s (1976, 148–9) suggested date for the arena wall which was derived from pottery found in the seating bank behind it.

External activities

Phase 5: Amphitheatre 1a use

Activities that took place outside Amphitheatre 1a, and contemporaneously with its use in Phase 5 are attested by features and finds from Area A and Trench 47. The most obvious features are the three large pits, all of which have some evidence for the disposal of cess, and all of which seem to have been later filled with refuse. It seems likely that these were three of a range of cess pits intended to act as latrines for spectators. The existence of such facilities, of course, would imply at least that the amphitheatre saw some use in this phase. This is supported by the existence of post-holes and apparent floor surfaces, possibly reflecting the presence of the kind of temporary stalls or structures outside the amphitheatre which are certainly attested stratigraphically in the later phases. At a point before the alterations of Phase 6, the cess pits were backfilled and a widespread levelling deposit, consisting apparently principally of refuse (625) was deposited to the south-east of Area A. It seems likely that these refuse deposits represent a hiatus in the use of the amphitheatre,

possibly indeed in its construction, prior to the structural alterations of Phase 6.

The fills of the cess pits on the west and south sides of the amphitheatre are similar in the finds material contained, as is the extensive layer (625) on the south-west side of Area A. All of these contexts contained a highly varied range of material. There is a marked contrast between these deposits and contemporary layers from the north-east end of Area A. The deposits excavated, including the two cess pits, are similar in stratigraphic position and yet the range and quantity of finds in the south-west area is far greater than on the north-east side. This pattern was also observed in Phase 3 (p 74), and may reflect the presence of domestic and industrial activity to the west of the amphitheatre, but not to the east. It seems possible that extra-mural activity beyond the fortress walls had only extended eastwards to the western side of the amphitheatre at the time of construction, and that these finds marked the easternmost ‘overspill’ of refuse from this occupation. There is a further possibility, and that is that the refuse is part of dumping in the Souters Lane ravine. There is unfortunately little evidence available from which to draw conclusions about the chronology of the spread of occupation in the eastern *canabae*. A watching brief at Albion House, south of the fortress and west of the amphitheatre, showed early Roman stratigraphy, though the only find from the earliest deposits was a samian ware sherd of early to mid-Flavian date (Dodd 2010b). To the north of the amphitheatre an excavation to the north of Lumley Place produced an early pit containing late 1st-century pottery (Robinson and Ward, S 1975, 42).

When the finds are considered as a whole, the idea mooted on site that these deposits exclusively reflect activity associated with Amphitheatre 1a is not tenable. These are very mixed and varied refuse deposits. The total assemblage from these Phase 5 deposits is very similar to that from the seating-bank dumps of Amphitheatre 1b (Phase 6) which consisted of refuse of all kinds, although the Phase 6 seating-bank deposits contained a larger quantity of finds. The range of mammal, bird and fish bone is almost identical. Both contain a near-identical range of samian ware and coarse pottery in terms of date, fabrics and form types. All types of glass, vessel, window and polychrome, occur in both groups, as do both melon and amber beads. The range of small scrap objects of metal – copper-alloy tacks, pins, nails, sheet and strip, lead droplets and amorphous scrap pieces, and iron armour fragments, chain-links, hobnails etc – is again markedly similar. Each group contains a trumpet-brooch of identical type (Func Cat nos 40, 41). A wider range of CBM forms was recovered from the Phase 6 seating bank deposits, although the greater quantity of all kinds of material recovered from this group as a whole may be a partial explanation for this. There is a difference between the CBM in the groups in that the Phase 5 assemblage is more broken and fragmented. Similarly there is a different range of painted plaster colours, with

the Phase 6 seating-bank material containing both different colours and a wider range.

The principal difference between the two groups is that personal objects that might be casually lost, two coins, three intaglos and a seal-box, all come from the deposits of Phase 5 around Amphitheatre 1a, while this type of object is absent in the largely bulk assemblages of the Phase 6 seating bank. This may tentatively indicate that the Phase 5 finds reflect both dumping deriving from occupation elsewhere, and casual loss *in situ*, which in turn suggests that these deposits do include material deriving from activities around the amphitheatre, though it is not possible to distinguish further.

What is perhaps surprising is that rubbish should have been disposed of on the surface around the exterior wall of Amphitheatre 1a. This evidence is consistent with puzzling structural aspects of Amphitheatre 1a. The best conclusion to reach may be that the building was partially completed and rarely used during the twenty years or so from its construction to the Phase 6 alterations.

Phase 6: Amphitheatre 1b construction

The finds from the seating bank in Area B do not contribute to the interpretation of the amphitheatre though they demonstrate very clearly that the bank in this area, in contrast to Area A, was composed of material from elsewhere in Roman Chester, much of it apparently refuse. It seems that the material from the excavation of the arena was insufficient for the job and more was required to complete the bank. If this is the case the assemblage of material from these deposits is important in showing something of the range of activities practised in the fortress and *canabae*, and the types of building existing there, as well as suggesting the demolition of buildings prior to c AD 100, as attested by some of the building materials, particularly the daub and painted wall plaster.

Phase 7: Amphitheatre 1b use

Unlike the deposits of Phase 5, it is certain that the stratigraphy outside the wall of Amphitheatre 1b reflects activities taking place *in situ* around the building. Ironically this is in part proven by the fact that there are fewer finds within this material, indicating that the area was kept more or less tidy and that dumping was not an element in deposit formation.

The stratigraphic evidence shows that, at intervals within the sequence of surfaces, post-holes and other features indicate the presence of temporary timber structures built against or close to the outer wall, in the space between the kerbed road and the outer wall. This space may have been reserved for such structures, which were probably market-type stalls. The existence of such stalls is vividly demonstrated at Pompeii. Here, within the arched niches on the outer face of the amphitheatre wall, painted inscriptions have been recorded. The most complete records the granting

of permission by the *aediles* to one Cn Annius Fortunatus to occupy a pitch (Cooley and Cooley 2004, 180: *CIL* IV 1096). Three fragmentary inscriptions (*CIL* IV 1096a, 1096b, 2485) record the granting of similar consents, while a further two (*CIL* IV 1097, 1097a) state that places are occupied (*'Locu[s] occupat[us] est'*). The famous wall painting from the House of Actius Anicetus depicting the amphitheatre riot of AD 59 (now in the Naples Museum) shows a tented stall in the piazza in front of the amphitheatre of a form virtually identical to that suggested for Chester (Fig 149).

At an early stage in the analysis of the finds, it was suggested that such stalls sold snack food and souvenirs to spectators. It is difficult to see what else they might have been for, though the evidence of stratified finds is less strong than previously assumed (Wilmott 2008, 179). The finds included similar material to Phase 5, but in much smaller quantity. In Phase 5, before the widespread refuse deposit which prefigured the construction of Amphitheatre 1b, however, there were hints of floor surfaces, roughly metallised surfaces, *in situ* industrial activity and the post-holes of temporary structures, and it seems likely that the activity attested in Phase 7 was a continuation of that in Phase 5, although the continuity was interrupted by dumping and the construction work of Phase 6.

It was previously suggested that the fragments of portable ceramic ovens found on the site (Heke and Smith 2009, 4; Heke 2014, 9) might have been evidence for the preparation of snack food for spectators, and they certainly would have been ideally suited to such a context. Examination of these finds by Area and Phase shows that the largest number of fragments of this material came from Area A (12 fragments and 48% of the assemblage by weight). Within Roman phases, one fragment came from Phase 5 in Area A and four from the seating-bank deposits of Phase 6, the rest were found residually. In Area A, five fragments derived from disturbed contexts such as robber trench fills and a further six from medieval and later phases, the latter quantity being comparable with quantities from the other two areas. It would be stretching the evidence to continue to assert with any certainty that these ovens related to food preparation on site, although this would parallel the ovens found around the rear wall of the theatre of Mandeure (*Epomanduodurum*; *Germania Superior*), France (Blin and Marc 2016, 215–6), which are interpreted as catering for religious feasts, though they could just as well be providing food for visitors and spectators.

Other evidence however does suggest that *in situ* food consumption was taking place at the amphitheatre. Few sites in Roman Britain have as high a percentage of domestic fowl as the deposits of Phase 7 in Area A – those deposits which we can, with confidence, associate with activity taking place at the building itself. The site with the most similar pattern is the 1st to 3rd-century legionary bath-house at Caerleon. The 'high amounts of domestic fowl indicate it may have been the snack of choice' (p 410; Table 122).

Similarly, Area A Phase 7 included more contexts producing oyster shell than any other phase. These contexts yielded the largest quantity of shell after the dumps of Phase 5 and the seating bank dumps of Phase 6 (Carrott and Beacock 2009, 4). It seems possible, therefore that oysters, formed a part of the diet for spectators at the amphitheatre. (For further discussion see pp 212–13).

As well as snack food it has previously been suggested that the amphitheatre stalls dealt in souvenirs (Wilmott 2008, 179). This was largely based upon the finding of a noteworthy small samian ware bowl (Sam Cat no 75) depicting gladiatorial combat. Although this, like many of the oven fragments, was found in a robber trench context, it was about half complete, and may have been redeposited from the disturbance of contexts of this phase. The significance of arena and hunting themes on samian ware vessels from the site is discussed at length below (pp 236–7).

Whether the two vessels of which a large number of sherds were found within the shrine (p 295) were used in ritual is, of course, impossible to say.

Sand supply

The one aspect of the economy of the amphitheatre and the logistics of spectacle that we can be certain of is a surprising one – the supply of sand to floor the arena. There can be no doubt that this was the reason for the extensive deposits of soft, yellow, glaciofluvial sand found around the outer wall of the amphitheatre in Area A. The frequent dumping and removal of this material demonstrated in the microstratigraphy (p 131–2, Figs 116, 117) shows that the sand was either imported and dumped against the amphitheatre wall to be carted into the arena when needed, or that it was removed from the arena and piled for subsequent removal from the site, or indeed, both, and that this was done fairly frequently. The yellow sand contrasts starkly with the gritty red sand native to the site. The probability is that this was brought from the surface exposures of such sand towards Upton, Hoole and Waverton, and that this resource was first exploited for the making of mortar for the construction of the fortress and its buildings. It is at least interesting in this context that the concentration of small Roman camps to the east of Chester lie in areas of these exposures (Fig 2; Philpott 1998), and it is possible that the supply of this material was under direct military control.

If the threshold and floor level of the *Nemeseum* were level with the surface of the sand in the arena, the arena would have to be some 250 mm deep in sand (significantly this is equal to the depth of the tethering stone recovered in the arena phase of Amphitheatre 2, p 194). The arena stratigraphy of the amphitheatre of Augst-Neun TÜRME (*Augusta Raurica; Germania Superior*), Switzerland, survived intact, and the depth of sand was similarly

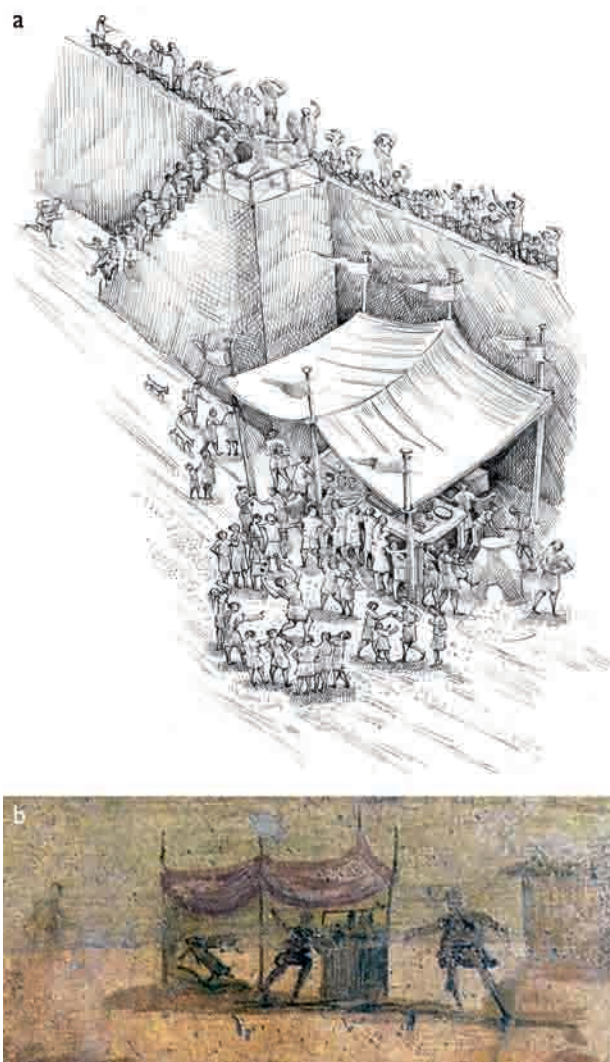


Fig 149 (a) Reconstruction drawing by Judith Dobie of the stall attested behind the external stair of Amphitheatre 1b. Note the portable oven to the right. (b) A tented market stall – detail from the famous painting of the Pompeii amphitheatre riot of AD 59 (From a photo by Carole Raddato; <https://www.flickr.com/photos/carolemage/17105933547>).

200–300 mm (Hufschmid 2007, 200, abb 182, 183). It is salutary to note that if such a depth was consistent across the 2,230 m² arena, it would have been necessary to import and spread 557.5 m³ of sand. At a weight of 1.6 tonnes per cubic metre of dry sand, this would weigh 892 tonnes (Simetric 2016).

At Augst-Neun TÜRME, geoarchaeological analysis by Rentzel (2007) found evidence of phosphates from faecal matter and urine that had soaked into the arena sand. Coprolites were also found, presenting graphic evidence for animal spectacles. The micromorphology of this material showed that crusts formed on the surface of the arena sand had been disturbed by raking. This accords with literary



Fig 150 Reconstruction drawing by Judith Dobie to show the delivery of arena sand. Note that the cart has slipped from the roadside kerb as archaeologically attested (Fig 124).

evidence. In an epigram, Martial (*Epigrammata* 2.75) records that a lion, ‘cruel and malicious, ... slew with furious tooth two boys of that young band whose duty it was to put a new face on the ensanguined arena with their rakes’ (*‘Nam duo de tenebra puerilia corpora turba, sanguineam rastris quae removabat hummum’*). It thus seems likely that rather than replacing the sand wholesale, the Chester arena may have been regularly resurfaced with fresh material, with total replacement of the sand taking place only occasionally.

The delivery of sand would require the frequent passage of wheeled traffic, and this may have been the context for the ruts alongside the road kerb (Fig 124) caused by the slippage of a cart onto the roadside. It is possible that this was a sand cart, and this scenario is depicted in Fig 150.

3.2 THE SECOND ROMAN AMPHITHEATRE (PERIOD 4)

INTRODUCTION

Amphitheatre 2 is the largest and most elaborate example of this type of building in Roman Britain. Its size, the number, complexity and organisation of entrances and the treatment of the exterior façade all place it in an architectural class beyond that of the other amphitheatres in the province, though it shares many features with military and civil amphitheatres in the western empire, both on the frontiers and beyond. Unfortunately the level of survival of the building is in inverse proportion to its original size and form. It has been comprehensively robbed, and then largely overbuilt and subjected to all manner of later disturbance associated with the overlying structures, first by the digging of cess- and rubbish pits from the 13th to the 19th century, then the provision of cellars to several buildings, the excavation of sewers and service runs, and even a motor car inspection pit that was cut through the outer wall (see volume 2 of this report). This has meant that the survival of the structure and archaeology of the building is very patchy. The following descriptions reflect this. From the evidence that remains it has, however, been possible to offer a convincing reconstruction of the building's original architecture.

Amphitheatre 2 is effectively Thompson's (1976) 'stone amphitheatre' with one main change – the fact discussed in the preceding chapters that his 'concentric wall' was the outer wall of an earlier and demolished building, and had no functional relationship to the second structure. As will become plain there are several other deviations from the Thompson interpretation.

The amphitheatre had the potential for four main entrances leading down into the arena, two at the end of each of the long and short axes, though topographical factors strongly suggest that there would have been no such main entrance on the western side (below p 178) and this is reflected in the plan (Fig 151). In addition there were two *vomitoria* in each quadrant of the building, allowing access to the *summa cavea*. This gives a total of twelve entrances. It seems logical, therefore, to number these as if the amphitheatre was a clock face, with the north main entrance designated as Entrance 12, and the northernmost *vomitrium* of the north-east quadrant of the building Entrance 1.

The arena, arena wall (though this appears to have been partially renewed), and *Nemeseum* appear to be elements of Amphitheatre 1b that were incorporated into the later building (p 176). The principal surviving 'new' elements of Amphitheatre 2 are therefore the outer wall and the 12

entrances. Within the arena the latest drainage features and evidence for arena furniture are also ascribed to this phase. The principal north and east entrances (Entrances 12 and 3) were explored by Thompson as were three *vomitoria* on the northern half of the structure (Entrances 1, 2, and 11). Keith Matthews also excavated a trench in Entrance 2 with important results. The *vomitrium* Entrance 10 was excavated by Newstead, and later damaged, if not completely destroyed, by the construction of air-raid shelters (p 13). In the south-west quadrant of the building, beneath Dee House, the first discovery of the amphitheatre in 1929 was linked to *vomitrium* Entrance 7, while later trial-trenching revealed the bottom of the robber trench for one side-wall of Entrance 8 (Buxton 1993, Trench 19). Finally a small portion of the remains of Entrance 4 was found in Area B in 2004–5.

In terms of the archaeological phasing for the 2004–6 excavation the construction of the building is Phase 8. However in order to understand the building as fully as possible, it is necessary first to describe the archaeological evidence for its form, and then to attempt a reconstruction. After this, a further section will consider evidence for the use of the building and alterations made during its life in Phase 9.

AMPHITHEATRE 2: THE ARCHAEOLOGICAL EVIDENCE (Phase 8)

The outer wall

The outer wall of the building was the first part to be found – by Williams in 1929. It is perhaps surprising how little work had been done on the wall between this date and 2004. Small exposures in 1934 had confirmed its line, but not its construction. In 1957–9 Thompson excavated nine trial-holes to locate the wall, and this was followed in 1968 by the excavation of six trenches, which tended to be expansions of the original trial-holes (Fig 19). These revealed that the wall had been badly robbed. Thompson's location of external 'buttresses' (Fig 20) was therefore conjectural (Thompson 1976, 138–9). In 1993 the line of the outer wall close to Williams' first observation was confirmed (Buxton 1993: Fig 24, Trench 8), and it was observed again in the 2000–2001 watching brief (Garner 2001, Fig 161). The only time the outer wall has been examined in the context of an open area excavation was in Area A in 2004–6.

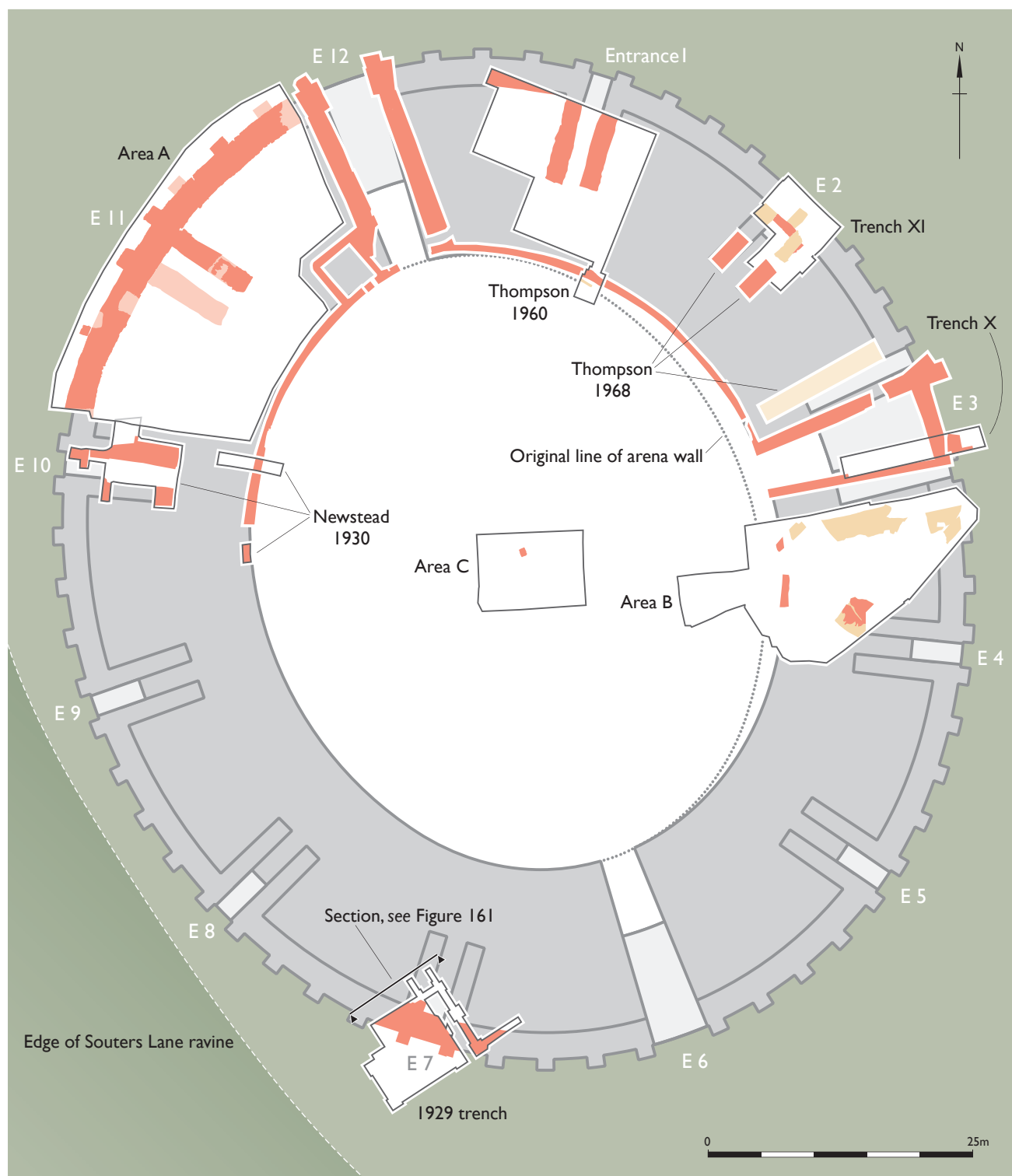


Fig 151 Outline plan summarising all known features of Amphitheatre 2, showing excavation areas and numbers allocated to entrances.

In Area A, the uppermost sandy deposits around the outside of Amphitheatre 1 (698, 624, 554, 715, 716, 669, 125) were cut by the construction trenches for the walls of Amphitheatre 2 (Fig 152). The outer wall construction trench (630=652=683) was a long, curvilinear feature running parallel to the outer wall of Amphitheatre 1 at a

distance of some 2 m. It measured 2.7 m broad and was 1.7 m deep. It was cut to this depth in order to penetrate to the level of the top of the sandstone bedrock. To the west of the main north entrance (Entrance 12), it was cut from the level of a metalled road surface of Phase 7(1038) (Fig 153). In the small exposure of the side and base of



Fig 152 Plan of Amphitheatre 2 in Area A.



Fig 153 Construction trench for Amphitheatre 2 at the southern end of Area A, looking north. The linear cut on the right is the robber trench from which all facing stones and core for the outer wall has been removed. To the left is the upper sand deposit of Site Phase 7.



Fig 154 Sondage originally cut by Thompson in 1960 to reveal the depth of the outer wall foundation.

the foundation (within Thompson's excavation sondage west of the main north entrance (074)), it was clear that the sandstone bedrock had been chiselled flat within the trench in order to achieve a level footing (Fig 154).

The foundations themselves (700, 709, 500: Fig 153)

were as deep and broad as the trench dug to accommodate them. They comprised large (up to 0.6 m long), roughly dressed sandstone blocks laid in courses. The blocks were dressed to reasonably square, outer faces, with the upper and lower surfaces cut level. The core was less evenly built. There were seven foundation courses, averaging 0.15–0.21 m thick (Fig 154), bonded with a very hard and sticky, brown, puddled clay (726=757=1220), which also sealed the stonework of the foundation in order to level off for the construction of the wall (Fig 155). As all of the stonework of the foundations in Area A survived later robbing untouched, it seems likely that stone robbers interpreted this clay deposit as the base of the wall, beyond which no further stone would be found.

A very small amount of standing fabric of the inner face of the wall survived later stone robbing (Figs 153, 155, 196). The evidence of the bases for engaged pilasters (below), which would certainly have butted the outer face of the wall, indicated that the outer face was built at the outer edge of the foundations with no offset. A single stone only remained of the outer face of the wall, close to Entrance 12, but this was enough to confirm this impression. The only other place where the outer wall has been examined in detail was in 1929 at the site of first

discovery. Figure 156 is Lawson's section through the outer wall (for location, see Fig 188). This shows coursed foundations set in puddled clay, and, crucially indicates the point above the clay at which mortared coursing begins. This coincides with the base of a very large block set on



Fig 155 Foundations of the outer wall partially excavated at the northern end of Area A, looking south. The top of the laid foundations on the right are overlain by a deep clay levelling deposit upon which the outer wall was constructed.

the outer edge of the foundations where the inner face is composed of smaller coursing, as was the superstructure of the outer wall (Thompson 1976, 155).

The original plan and photographs show the character of these blocks (Figs 6, 188, 189). The 1929 photos have been scrutinised by the masonry specialist Peter Hill (pers comm, Jan 2015) who comments as follows:

'I do not believe that any of these stones were intended to be seen – there is a horrible crudity about them, even by typical Roman military standards. The two stones to the right are somewhat better than the other two, but they are smaller in bed height. They appear to be sitting on some sort of foundation raft, so height would not be important so long as the top beds were all at the same level as seems to be the case. I judge that they were worked with a heavy pick. The second stone has a large boss left on it, below which the stone seems to be broken away, and the appearance clearly did not matter. The first stone is slightly better with a flatter face, probably worked with a heavy punch (although this has to be something of a guess working from a photograph). I do not think that the upper edges of these four stones were to be seen, as one would have expected at least an attempt at a worked margin along the upper edge, which is clearly absent. If any of the wall were to be visible, I would expect it to be the course above this one.'

It is no coincidence that in Area A the outer face of the wall has been preferentially robbed below the level at which mortared coursing begins on the inner face (Fig 153). There is certainly room in this deeper robbing for such blocks as recorded in Lawson's section, and it appears likely that these blocks formed a lower, outer course to the entire outer wall, providing further strength to support the height and mass of the structure. Thompson (1976, 155) also considered that these larger blocks were a 'plinth course'.

Three segments of the inner face of the standing wall survived; a section 5.9 m long close to the main north Entrance 12 (709, Fig 152), one 2.6 m long immediately east of the *vomitorium* Entrance 11 (305), and a further segment 2.2 m long to the east of this *vomitorium* (626)

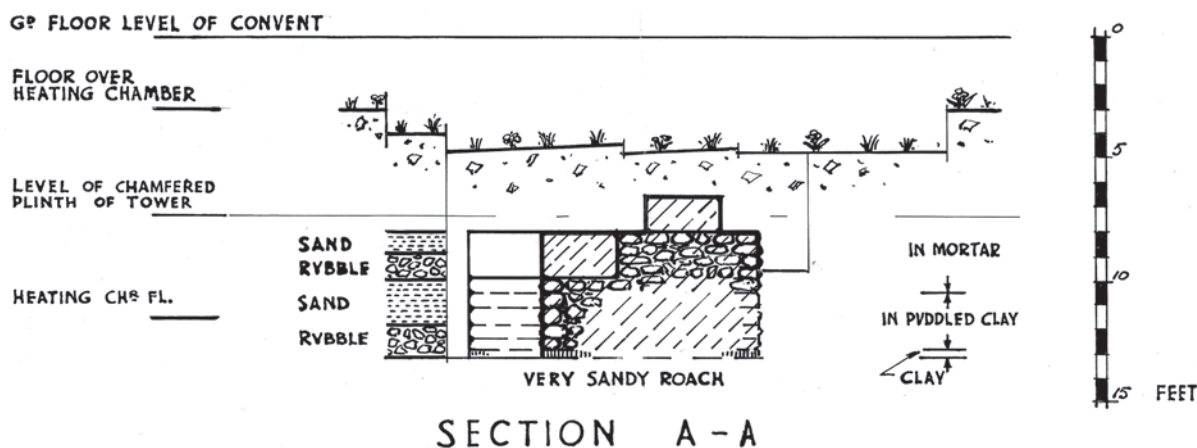


Fig 156 Section through the outer wall at the site of first discovery in 1929, drawn by P H Lawson (for location, see Fig 188).



Fig 157 Fragment of the inner face of the outer wall showing quality of masonry and hard white mortar bonding.

(Fig 196). This face was offset 0.62 m back from the inner face of the foundations. No wall segment survived higher than four courses, however, this was sufficient to establish that the two lowest courses gave a wall 2.08 m in width, with the 3rd course offset by 0.18 m, giving a superstructure wall width of 1.9 m. The facing stones ranged from 0.20–0.40 m in length, with courses 0.3 m in height. They were bonded with a very hard, white lime mortar (Fig 157). Peter Hill (pers comm) points out that the quality of the finish of these stones was better than that on the outer wall of Amphitheatre 1, despite the fact that this stonework would have been hidden behind the seating.

The 0.62 m gap between the inner wall face and the inner edge of the foundation trench was backfilled (Figs 158, 159) with a succession of layers, which, though separated during excavation, comprised varying concentrations of red sandstone chips and fragments within a matrix of red sand. The whole of these deposits (653, 658, 659, 684, 686, 687, 679, 680, 681, 688, 689, 627, 628, 629) was derived from building activity, and primarily comprised mason's waste and chippings (Figs 125, 158, 159, 160).

Between this wall and the outer wall of the first amphitheatre, deposits of red sandstone chippings (724, 685, 692) were again the by-product of construction deposited on the contemporary ground surface formed by the earlier sands (Fig 152).

A service trench cut in 2001 allowed an oblique section through part of the outer wall to be observed in the same area as Williams' initial discovery (Fig 161, for location see Fig 190). The earliest layer in the area was a compact light yellow-brown clay (G302) that was thought to be naturally deposited. This was cut by a curvilinear trench (G301) that accommodated the stone foundations (G300) to the outer amphitheatre wall. As in Area A, the foundations consisted of dressed sandstone blocks laid in roughly horizontal courses and bonded in a red-brown clay. At the level of the top of the presumed natural clay (G302), the foundation gave way to an up-standing masonry structure



Fig 158 Upper levels of yellow sand of Site Phase 7 cut by the construction trench of the outer wall which is filled with red sandstone debris. The actual outer wall is represented by the robber trench to the left.



Fig 159 Site Phase 7 yellow sand deposits cut by the red sandstone filled robber trench to the outer wall (see also Fig 125).

(G297). This consisted of two dressed sandstone blocks of the bottom courses of the inner wall face, surviving to a maximum height of 0.4 m and bonded with white lime mortar (G295). Behind these blocks was a sandstone rubble

S 6013

SE

⌵

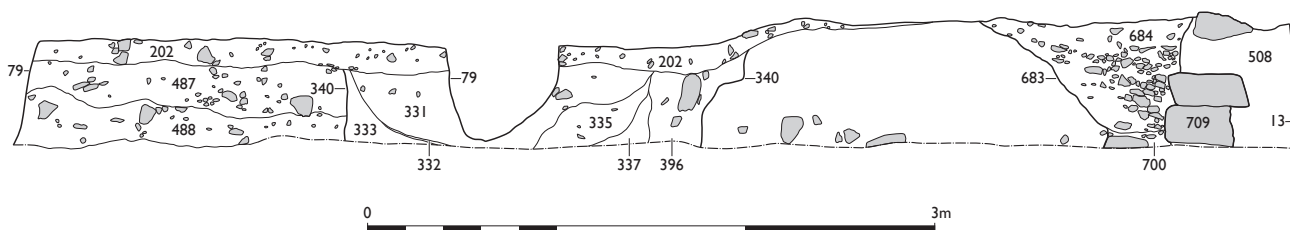
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Fig 160 Section S6013 in the edge of a service trench in Area A. Shows the cut (683) for the construction trench of the outer wall foundation (700) and superstructure (709) (for location see Fig 152).

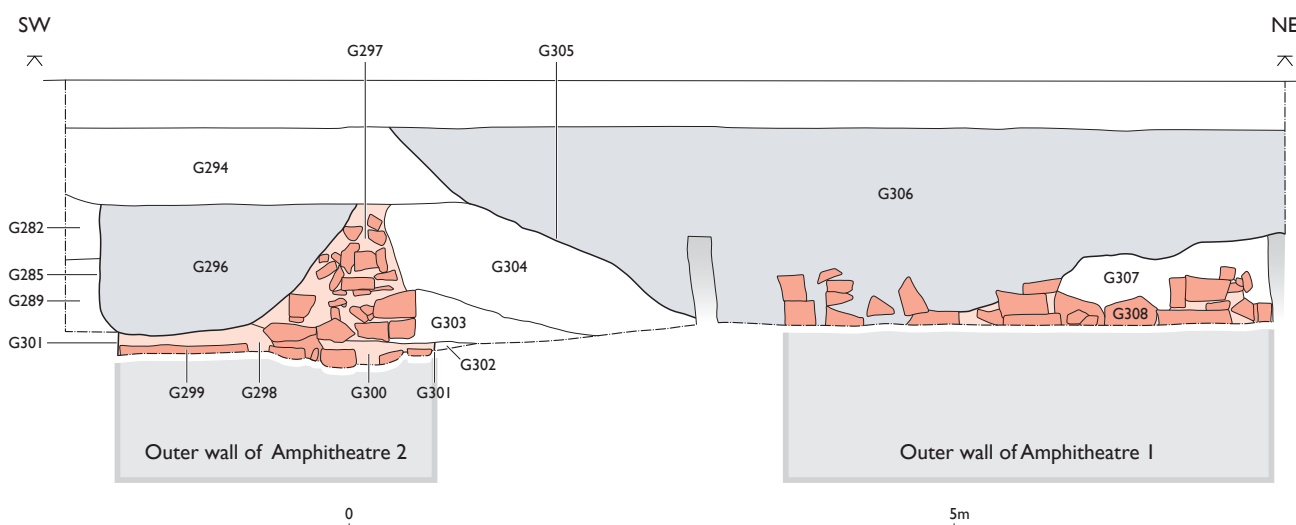


Fig 161 Section through the amphitheatre walls to the south (for location see Figs 144, 145, 190).

core, surviving to a maximum height of 1 m and bonded in identical lime mortar. Within the foundation trench (G301) and immediately to the west of the sandstone core the top of a large rectangular sandstone block (G299) was seen. Although set in a similar red-brown clay (G298) to the wall foundations, the fact that this block was set within the foundation trench, on the outer face suggests that this was another stone of the course recorded by Williams and Lawson as part of the running foundation rather than, as the excavator first thought, part of a projecting buttress (Garner 2001, 9). The impression that this is part of the wall face seems to be confirmed by the substantial robber trench (G295). Against the inner wall face was a dump of clean red sandstone (G303) which appears to be the same as the red sandstone construction trench fill seen elsewhere.

The major entrances

Of the three major entrances to the amphitheatre one (Entrance 6) remains uninvestigated. The other two,

the east and north entrances (Entrances 3 and 12) have been previously excavated, with both being cleared for conservation and display by Thompson.

Entrance 3

Entrance 3 was the principal east entrance, situated on the eastern end of the short axis of the building. It has had a varied history of excavation over the course of the 20th century. It was originally located in 1930 (Newstead and Droop 1932a, 11–12) in Newstead's Trench 2 (Figs 10, 13). At this time the whole of the northern passage wall was exposed. In 1960 the trench for the concrete retaining wall that bisects the amphitheatre came down on the top of the southern passage wall. Recording was minimal, and the concrete wall covers half the width of the passage wall, rendering it inaccessible for any future examination. From 1966–68 the remainder of the entrance was excavated by Thompson (1976, 173–179) in advance of consolidation for display. The fabric as it stands today includes a number of anomalies which cannot now be



Fig 162 The central passage of the main eastern entrance, Entrance 3 to show detail recorded in Matthews' Trench X.

readily interpreted. Some of these are certainly the result of the adaptation of the structure in the post-Roman period (see volume 2 of this report), while others may be a function of consolidation rather than of original construction. In 2000–2003 Matthews' Trenches V and X were excavated within the entrance passage. In 2005 the final element of this entrance was found in Area B.

Matthews' trenches are the most accurately recorded observations in the entrance, and Fig 162 combines his evidence with that of Thompson, remembering that Thompson did not produce stone-by-stone drawings, but only block plans. All of the masonry in this figure was recorded after consolidation and re-pointing. Thompson did not totally excavate the entrance, and Matthews' work therefore provides evidence for the early sequence. Importantly this work showed (p 83) that the outer wall of Amphitheatre 1 was continuous across the later entrance, and was robbed out almost completely to its rubble foundations in order to build the east entrance (M242, robber trench, M319; Figs 59, 138). The robber trench was backfilled with a red sandy

material (M290) the description of which is reminiscent of that of construction trench fills of Phase 8 in Area A.

The foundations of the outer wall of the amphitheatre were continued across the entrance as a sleeper wall, tying the foundations across the aperture (Thompson 1976, 174). In the photograph of the wall under excavation in 2005 the sleeper wall appears to survive to a high level and has been interpreted as a blocking of the original portal (Fig 163). This is illusory. The coursing was rough and unmortared, like the foundations of the outer wall (Fig 154), and unlike the surviving fragment of superstructure (Fig 153) recorded in Area A. Furthermore the top of the sleeper wall was level with that of the course of large foundation blocks on the north side of the passage upon which are the marking out lines for the superstructure.

At the outer end of the funnel-shaped entrance, the side-walls were 7.2 m apart. They measured 1.21 m thick. The northern side-wall was well preserved, with a course of substantial sandstone blocks forming the footings for the outer face of the outer wall, the passage wall, and a



Fig 163 The sleeper wall crossing Entrance 3 under excavation in 2003. The elevation in the deeper section is that of the foundation courses.



Fig 165 Matthews' Trench X showing unconsolidated area of the sleeper foundation and the south buttress of Entrance 3 cut through Site Phase 7 metallised surface M442 (see Fig 59).



Fig 164 Northern buttress of Entrance 3 excavated by Thompson, showing mortar pad and setting-out lines.

projecting buttress or pilaster. These large blocks were laid at ground level above the deep coursed foundations of the outer wall. On the upper face of the blocks, setting-out lines for the superstructure of the outer wall and for a buttress or pilaster flanking the entrance were scribed (Fig 164). These lines showed that the pilaster was to measure 0.9×0.76 m at the base (Thompson 1976, 174). The projecting buttress on the south side of the entrance was devoid of its large block, but the foundation survived and was recorded in Matthews' Trench X (Figs 162, 165; M390). In his text, Thompson (1976, 174) states that the primary passage walls of the entrance terminated 1.51 m short of the arena wall and butted a stone and clay surface. The photograph called in evidence for this, featuring the south passage wall in the



Fig 166 Thompson's excavation photo of the west end of the south wall of the central passage of Entrance 3 showing a butt-joint with the rear face of the arena wall.

bottom of the cut for the 1960 concrete retaining wall (Fig 166) shows this relationship, although the 'surface' does have the character of a wall foundation. The width of the entrance aperture at the arena wall was some 4.10 m.



Fig 167 Threshold in the southern side-wall of the central passage in Entrance 3.

Most of the southern side-wall was obliterated when the concrete retaining wall was built. However the inner face survives, and in its consolidated state shows interesting features not mentioned by Thompson. The construction trench (M496) excavated within Trench X clearly cut the fill of the robber trench for the outer wall of Amphitheatre 1. The most important detail however is a threshold 1.6 m broad which pierces the south wall at a distance of 1.6 m inside the passage, measured from the inner face of the sleeper wall (Fig 167). This is certainly of one build with the passage wall, and on its inner side two, well-squared courses of stone form the side of the doorway. A rebate cut in the threshold block at this side is probably part of the provision for a door. No counterpart to this threshold on the northern side survives, but the north passage wall was both robbed and disturbed by the excavation of a medieval cess-pit at the precise point at which such a threshold would have been located (Thompson 1976, fig 18). This pit may have originated as a stone-robbing hole.

Within the passage at the outer end, the uppermost of the deposits through which the robber trench for the earlier outer wall was cut (M297, Figs 138, 162) was capped with a gravel deposit (M346). This was almost certainly a remnant of the 'lightly metalled surface which can be regarded as the original passage floor' that Thompson (1976, 175) recorded. The surface lay at 18.75 m OD. Further to the west a similar pebble surface (M244=M275) surfaced at 18.49 m OD. The difference in level between these surfaces can be explained by the slope of the passage into the arena. Matthews identified scraps of mortar flooring (M243, M289) overlying this surface, though this was not noticed by Thompson. In 1968, in the centre of the passage Thompson recorded, and removed a 'paved surface' 1.8 m wide comprising sandstone rubble (Thompson 1976, 75, fig 18; Fig 170). Although no other evidence was recovered by Thompson, the central location of this surface, which does not appear to have been cut away at the sides, suggests that access along the passage was divided, possibly by the use



Fig 168 Details of the reused gate sill at the arena end of Entrance 3. (a) The north jamb of the later entrance, (b) Thompson's excavation photo of the portion of the sill reused as the later door sill.

of timber partitions (below p 203). Outside the disturbed area and against the southern Roman side passage wall, Matthews identified two shallow circular features 0.40 m in diameter (M210, M238) which he interpreted as column

settings. On his site plan Matthews also suggested that another such setting might have been positioned inside the side door of the passage, and another coinciding with the outer end of the post-Roman passage wall. It is however most unlikely that all of the surfaces and settings described here belong to the original layout of the entrance, or indeed that they were of Roman date (see Volume 2 of this report). The only dating evidence from Matthews' work consisted of 8 sherds of pottery dating to AD 120+ recovered from the pebble surface M244, M275 (Dunn 2003a, 44).

The inner end of the entrance was extensively remodelled in a later phase, involving cutting into the original sloping ramp. Thompson's published section shows such a cut coincident with the point at which substantial additional walls were built along the side-walls using reused Roman masonry (Thompson 1976, fig 18, section A-B). These walls were interpreted by Matthews (2004, 21) as post-Roman. This remains the most likely explanation for them, and they will be considered in Volume 2 of this report. Thompson recovered two column-drum fragments each 0.34 m in diameter, from the fill of the entrance passage (Thompson 1976, 177, pl liia). These he thought came from a collapsed *tribunal* that had been set above the entrance, however, they were recovered from the fill of the disturbed area between the post-Roman additions to the passage walls. They were thus a post-Roman deposition, probably following serial re-use.

Despite this truncation, the comparison of level at the outer end of the passage with that of the arena (modern surface) gives a theoretical slope for the ramp of about 1:6 (the equivalent calculation for the main north entrance (Entrance 12) is approximately 1:8 based upon Thompson's (1976, 171) record of drop and distance).

During the post-Roman remodelling of the entrance, the access to the arena was narrowed to a width of only 0.9 m. The sill and jambs of this later entrance (for which see Volume 2 of this report) comprised reused portions of a single gate sill (Fig 168). The lengths of the three surviving fragments of this sill (1.30 m + 0.86 m + 0.68 m) add up 2.84 m. There can be little doubt that these were originally laid in the broad arena entrance. The discrepancy of 1.26 m between the surviving fragments and the original gate width can be explained both by the loss of a further piece, and by the fact that the south jamb is broken. It may be significant that the piece reused as a sill features a pivot-hole and guide-slot similar to that on the top of the reused north jamb. It is probable that these two blocks marked the two ends of the original threshold. The north jamb features a number of holes. It is impossible to say whether some or all of these related to the original use of the sill and to timber arena gates, or whether some were, as Thompson (1976, 176) thought, bolt or locking-bar holes associated with its reuse. A lead plug within the block, however, is almost certainly a feature of its original use, similar to that found in the *in situ* threshold sill of Entrance 12 (Fig 177).

At a distance of 1.8 m to the north of the northern



Fig 169 (a) Thompson's excavation photo of the stonework in the robber trench of the northern side passage wall to Entrance 3. (b) Previously unpublished photo of excavation on Entrance 3. The large hole in the arena wall was caused by a post medieval pit. Behind this the vertical dark line is the fill of the robber trench of the northern side passage wall.

passage wall Thompson encountered a robber trench. This is best described in his words.

'It took the form of a strip 6 ft (1.8 m) wide whose filling, dark rubbly soil, contrasted with the general sandy make-up... It ran parallel to the north side-wall of the east entrance as far as the cess-pit F19 to the west and presumably extended to the east to meet the outer wall. ... it was found to be the robber trench of an earlier wall. The foundations had been carried into the clays below the old ground surface to a depth of 2 ft (0.61 m) and in one case the stone blocks, set in clay, still survived in the bottom and the edge of the trench. (Fig 169a). Thus the robber trench gave every appearance of having contained ... a solidly built masonry wall, probably extending from the



Fig 170 Features of Amphitheatre 2 in Area B with Entrances 3 and 4.

[outer] wall as far as ... the arena wall. Certainly the spacing between the northern main entrance [Entrance 12], Entrance [1], Entrance [2] and this ... wall looks more regular ... than the perceptibly wider spacing between Entrance [4] and the [north passage wall].’ (Thompson 1976, 177–178, redacting interpretative phrases).

The side robber trench is clearly shown in section in a previously unpublished photo (Fig 169b). Thompson was of the opinion that this was an earlier side-wall to the passage into the arena, possibly not completed because of a setting out error. The fact that this wall extended from the arena wall to the outer wall alone marks it as a part

of Amphitheatre 2, and the remarks on spacing suggest that if this robber trench was in fact the side-wall of the main east entrance, the spacing of the *vomitoria* in the north-east segment of the amphitheatre would be more even and make better sense. Rather than an abandoned foundation, it is more likely that this is the side-wall of a northern subsidiary passage to the main east entrance. The existence of such side-passages would make sense of the threshold in the south wall of the main passage, as such thresholds would afford lateral access to side-passages. It is unfortunate that the only plan record of the feature was its projected line on the published plan (Fig 20) where it



Fig 171 Area B. The robber trench at the bottom of the photograph is that of the outer wall of Amphitheatre 1 (Fig 61). Beyond the tree stump the two cuttings are sections through the robber trench of the south side wall of Entrance 3 (2545).



Fig 172 Thompson's general excavation photo of Entrance 12.

is marked as 'original north wall of east entrance'. This is reproduced on Fig 170.

Further evidence for the shape of the east entrance was found in 2005 in Area B (Fig 170). All stone walls in this area had been virtually completely robbed (Figs 59, 60). Here the outer wall of Amphitheatre 2 was located at the eastern extremity of the Area, in a small stretch of robber trench (2460) which could not be completely excavated due to safety considerations. In addition to the robber trenches identified for the outer walls of Amphitheatres 1 and 2 a third robber trench (2545=2567) was identified running on a radial axis from the outer wall of Amphitheatre 2 towards the arena wall (2604). The location of this trench and the existence of a large tree stump on its line made it impossible to excavate fully (Fig 171). This implies the presence of a substantial stone wall some 1.8 m in width, running on an east-west alignment parallel to the eastern entrance. This can only be the southern counterpart to Thompson's flanking wall. Although Thompson (1976, 177) interpreted the north flanking wall as earlier than the main passage, in his appendix to the same report Sunter (1976, 233, fig 53) implicitly contradicted this in his illustration, showing it as the wall of a contemporary side passage and projecting a southern equivalent. Sunter was clearly correct.

Thus Entrance 3 is revealed as having a triple entrance with a main central passage flanked by two side passages, which were accessed from the central passage by side doors (Fig 219). There is no evidence that the side passages gave into the arena, as there are no blocked apertures in the arena wall. It must therefore be concluded that these passages were for the use of spectators. The most likely interpretation would be that these were extra *vomitoria* affording access to the arena *podium* and the front seating (p 203).



Fig 173 Plan of Entrance 12 (after Thompson).

Entrance 12

Entrance 12 is the north main entrance into the arena (Figs 172, 173). It was excavated by Thompson (1976, 170–173), and Matthews excavated a small trench (Trench IV) across its width in order to establish whether any intact archaeology survived. It did not (Matthews *et al* 2003).

Unlike the east entrance, the northern entrance comprises a single passage, which is narrower than the central passage of Entrance 3. The following description is Thompson's account (1976, 170–172) omitting interpretative comment.



Fig 174 Stone slab levelling course in the west passage wall of Entrance 12.



Fig 175 The outer east jamb of Entrance 12 viewed from within the passage. The line of the passage wall is on the right. Note the large block and tooling pattern.

‘The general plan of the north entrance was relatively simple, but there were interesting minor features. The passage to the arena was defined by two sandstone walls and narrowed internally from a width of 17½ ft (5.26 m) at the inner edge of the outer wall to 11 ft. (3.31 m) at the arena wall. The walls themselves were heavily robbed, particularly along their inner faces, but were found to be generally 5½ ft. (1.66 m.) in width; their construction was of the normal coursed and mortared blockwork, but there was a change at footing level to a course of massive slabs spanning the width of the wall and no doubt intended as a levelling course (Fig 174). At the outer end the entrance was flanked by massive buttress foundations, 5 ft (1.52 m) wide and 3½ ft. (1.07 m) deep, and immediately inside the opening the outer wall foundations continued inwards for 1.5 to 2 ft (0.45 to 0.61 m), giving a width of 17 ft (5.11 m) at this point’ (Fig 175).



Fig 176 Steps from the inner end of Entrance 12 to the podium at the junction with the arena wall (a) during excavation in 1967, (b) as consolidated.

‘At the arena end the side-walls of the entrance did not continue to form a junction with the arena wall but ended in a squared-off terminal to leave an interval, at least on the east side, of 6 ft (1.8 m). The reason for this interval was quite clear, at least on the east side again, where the two bottom steps survived of a flight, 3½ ft (1.07 m) wide, placed between the end of the side-wall and the jamb marking the end of the arena wall (Fig 176). The steps ran up from the floor of the entrance passage at right angles and clearly served to give access to the gangway [*podium*] immediately behind the arena wall parapet. It was plain that a similar arrangement had held on the west side of the entrance, though here no steps survived’ (Fig 173).

‘Between the side-walls the passage floor ran down towards the arena on a gentle but uniform gradient [of approximately 1:8]. Over most of its length the floor consisted of the natural clay, clayey sand or sand which successively overlies the rock, and there seems to have been no attempt to pave the surface until one approached the doors to the arena. At a distance of c 10 ft (3 m) from the sill between the arena wall jambs the sandy surface changed to fairly massive slabbing which eventually became a continuous surface. However, there was no suggestion ... that this original surface was



Fig 177 Excavation photo of the gate sill and lead socket at the arena end of Entrance 12.

concealed beneath a later floor; on the contrary, it seems to have been maintained throughout without any build-up of soil or occupation material.

As might have been expected, a stone-lined drain ran centrally down the passage, disappeared beneath the stone slabbing, and presumably linked with the axial and peripheral drains in the arena, though the evidence was not entirely clear. It was normally at least 12 in (30.5 cm) wide, and where well preserved was 18 in (45.7 cm) deep with sides composed of three courses of sandstone blocks. ... At its northern end the drain formed a T junction, the arms of which led towards the projections into the passage of the outer wall.

One of the most interesting aspects of this entrance was the method by which it was closed to the arena when the need arose. The slabbing at the south end culminated in four massive stones spanning the 11 ft (3.31 m) gap between the ends of the arena wall. On the arena side these stones were worked into a continuous sill, 6 in (15.2 cm) wide, at either end of which was a 3 in (7.6 cm) diameter lead socket designed to receive the iron pivots for a two-leaved timber gate (Fig 177). Clearly, the leaves of the gate, each 5.5 ft (1.67 m) wide, opened inwards into the passage so as totally to conceal the flights of steps on either side leading up to the gangways behind the arena wall (Fig 218).

To either side of the gate the arena wall terminated in massive jambs composed of sandstone slabs, 2.5 ft (0.76 m.) wide, which were apparently left unrendered to contrast with the plastered surface of the arena wall itself. The individual slabs retained the lewis-holes by which they were put in place and had projecting 'nibs', 6 in (15.2 cm) wide and 4.5 in. (11.4 cm) deep, which evidently served to protect the pivot sockets for the gate.' (Fig 178).

The treatment of the west side-wall and its relationship with the *Nemeseum* was far from clear in Thompson's report.



Fig 178 The eastern jamb of the north entrance viewed from the arena.



Fig 179 Extract from Thompson's original pencil drawing showing his annotations of the area between west passage wall of Entrance 12 and the *Nemeseum*.



Fig 180 Recent photo showing the robbing of the outer face of the east wall of the *Nemeseum*, probably to insert a stair.

It is recorded in one of Thompson's original pencil site-plans (Fig 179). The inner end of the western side-wall is marked as having been faced. Between the face and the arena wall is an area of 'rubble make-up', though it has been

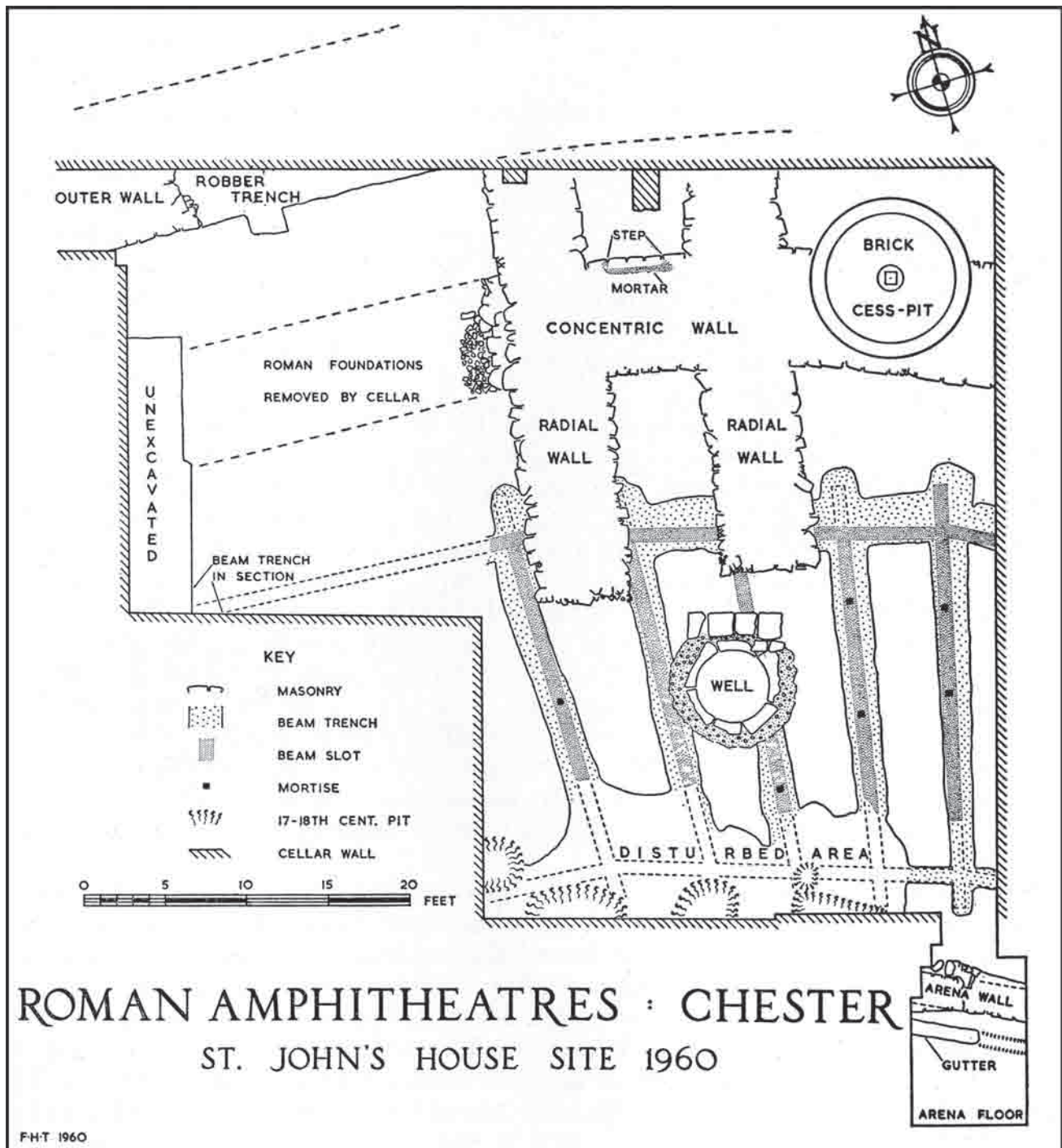


Fig 181 Excavation plan of Entrance 1 in 1960. The radial side walls of the vomitorium were assumed to be of one build with the outer wall of Amphitheatre 1 ('concentric wall').

argued above that some, if not all, of this material related to an earlier entrance passage, probably for Amphitheatre 1b and contemporary with the *Nemeseum* (p 126). At this point the eastern face of the east *Nemeseum* wall had been robbed out (Fig 180). It seems possible that this was done in order to allow a *podium* stair, like that on the east side, to be constructed over the *Nemeseum* wall such that

the earlier chamber could be incorporated into the later building (Fig 173).

The vomitoria

The *vomitoria* consisted of stairways leading from street level to a gangway or *praecintio* set about half-way up



Fig 182 Excavation photo of Entrance 1 in 1960.



Fig 184 Matthews' Trench XI within Entrance 2 under excavation in 2002. Note the two Roman steps in the centre of the trench.



Fig 183 Thompson's limited examination of the inner ends of the side walls of Entrance 2.

the face of the *cavea*, separating the *ima cavea* from the *summa cavea* (below p 198). There were at least eight of these 'minor entrances' (Thompson 1976, 180), two in each quadrant of the building. We would argue (p 198, 203) that Entrance 9, at the western end of the short axis, was also a standard *vomitorium*, as the proximity of this entrance to the edge of the Souters Lane ravine clearly precludes the siting of a major entrance here (Fig 151). Several of these have been wholly or partially excavated since 1930, and have been found to survive to differing degrees. By merging the information derived from each entrance it is possible to arrive at a reconstruction of their appearance. The *vomitioria* explored at different times are described below in a clockwise direction. All follow a basic plan, and in all cases the walls survive either as foundations or robber trenches. They comprise a pair of walls 1.8 m in width and 1.8 m apart set at right-angles to the inner face of the outer wall, and running for a distance of 7.80 m into the *cavea*. All previous excavators since Newstead have assumed that

the outer walls of the two amphitheatres were contemporary, that a corridor ran between them, and that the stairs in the *vomitioria* rose from the outer face of the 'concentric' wall. This idea was based upon the identification of supposed steps by Newstead in Entrance 10. The identification of the two amphitheatres, and work on Entrance 11 in Area A showed that the steps rose from the outer edge of the outer wall of Amphitheatre 2, and the discovery of two surviving steps in Entrance 2 both confirmed this and showed the character of the steps themselves.

Entrance 1

This lay immediately east of the main north entrance (Entrance 12). It was excavated by Thompson in 1960, where a single foundation course survived beneath the floor of the St John's House cellar (Fig 181). The fact that the *vomitiorium* footings cut the timber slots of the so-called 'grillage' was Thompson's first indication that there were two amphitheatres on the site. He associated the *vomitiorium* footings and those of the outer wall of Amphitheatre 1 (the so called 'concentric wall') as a single structure. In retrospect it is possible to see that the *vomitiorium* side-walls broke through the facings of the earlier wall footing (Fig 182). Basing his interpretation on Newstead's work on Entrance 10 (below p 185), Thompson interpreted the bottom facing course of the earlier wall between the *vomitioria* walls as a step.

Entrance 2

Thompson only examined the inner ends of the side-walls of this *vomitiorium*, at which point only two masonry courses survived (Fig 183).

In 2002, in his Trenches IX and XI, Matthews explored the outer end of the entrance (Fig 184). Here he found the robber trench and part of the side-wall of the *vomitiorium* (M65: Fig 185). More importantly, he discovered a crucial piece of evidence for the reconstruction of the building. Matthews described it as follows:

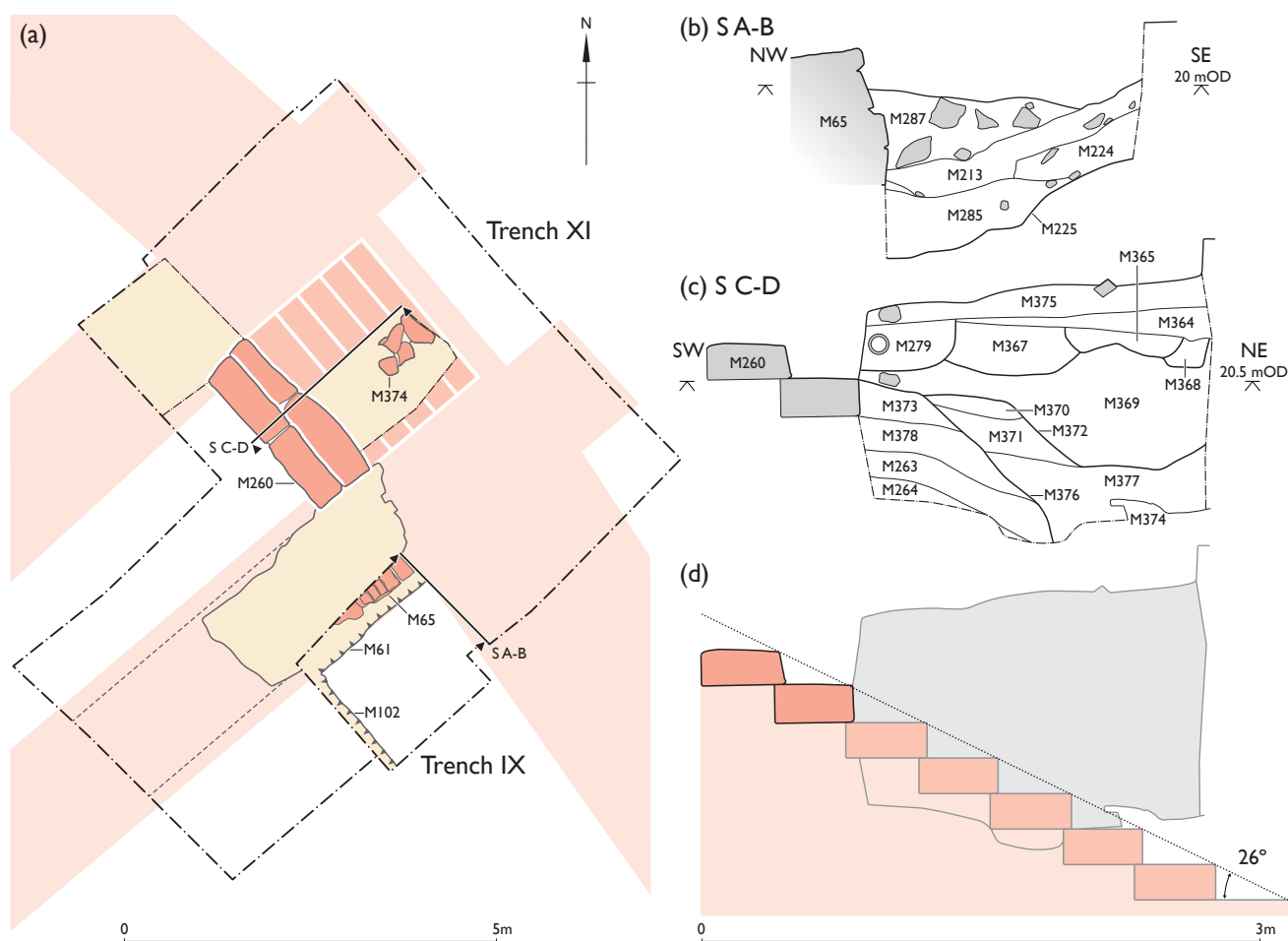


Fig 185 Entrance 2 (a) Plan of Matthews' Trenches IX and XI superimposed on plan of Entrance 11, excavated in 2004–5 (pale colour). The robber trenches and stonework exactly coincide. Steps below M260 are reconstructed. (b and c) Sections located on plan. (d) Reconstruction of flight of steps on the line of Section C–D showing angle of rise from the threshold marking-out line to the two *in situ* steps.



Fig 186 Excavation photo of the steps in Entrance 2.

‘One of the most significant discoveries made this year was that part of the staircase leading up to the seating of the amphitheatre had survived (Figs 184–186). Two steps remained in place, although the bottom steps had been removed in the nineteenth century and the side-walls that supported them in the seventeenth

century. What we have been able to show is that they belong to the 3rd century redesign of the monument: the original staircases were reached along a short stretch of corridor, but this had been filled in during the late 3rd century and the new steps started at the very doorway into the building.’ (Matthews *et al* 2002).

This was a truly remarkable survival. Matthews’ interpretation of phasing depended on the idea that the outer walls of the two buildings were part of a single stone structure and formed a corridor. We can now understand that the steps were part of the primary build of Amphitheatre 2. The two steps (M260) were found just beneath the topsoil and turf (Fig 184) and the surface of the upper step lay at 20.71 m OD. Measured across the edges of the surviving steps, the angle of the stairs was 26°. The treads measured 0.36 m in depth and the risers 0.20 m in height (Figs 185, 186). The flight of steps was 2.3 m wide. Each step comprised two stones, each between 1 m and 1.4 m long, and the treads were clearly worn smooth particularly on the leading edges, although as Matthews (2004, 14) pointed out the wear was fairly slight. The stair is reconstructed

in Fig 185, and the angle is demonstrated. It is clear that the deposits M263, M264, M373 and M378 are the fills of an early robbing of the stairs. The treads would certainly have been desirable for reuse, as they are large, regular and well-squared. Cut M376 is a later robber trench, doubtless for the removal of the outer wall of which the sandstone fragments (M374) may be part. This was cut in turn by the trench for the iron pipe (M279) seen in Fig 186.

The plan of Matthews' trench was overlain on the plan of Entrance 11, the complete *vomitorium* excavated in Area A in 2004–5. The correspondence of the two plans was remarkable. The fact that the robber trench (M102) for the outer wall of Amphitheatre 1 was recorded, together with part of the face of the southern side-wall of the *vomitorium* (M65) allowed an exact match of these features between the two structures, and the projected walls in the plan at Fig 185 are exactly based upon their counterparts at Entrance 11. Projecting the stairs at the established 26° angle, using the dimensions of the two excavated steps, it was found that the bottom step would have exactly matched the position of the setting-out line on the threshold block in Entrance 11 (below, Figs 195, 199), and therefore that the two steps in Entrance 2 were the sixth and seventh from the bottom of the flight.

Entrance 4

On the southern side of Area B a wall foundation was partly exposed (Fig 170). The wall (2527) was aligned north-west to south-east and terminated within the footprint of a post-medieval cellar (Fig 187: see volume 2 of this report). The north-western end of the wall had been heavily truncated by the cellar construction, although enough remained to be able to clearly distinguish the terminus. It was exposed for a length of 3.6 m and was at least 2.8 m wide, with the



Fig 187 Side wall of Entrance 4 as revealed in the section of an 18th century cellar following the removal of the cellar side wall.

greatest survival on the southern edge of the excavation, where it reached a height of 1.5 m. The wall was largely constructed from angular sandstone fragments bonded in a red clay matrix. In the base of the cellar the construction trench (2529) for wall (2527) cut the fills of Phase 6 slots (2574) and (2576). Trench (2529) could also be distinguished cutting through earlier seating bank deposits (2612), though this relationship was partially obscured by the sandy nature of the seating bank deposits which were prone to slumping. It is clear when this wall is plotted onto the overall plan (Fig 151) that this was the terminus of the northern side-wall of the *vomitorium* Entrance 4. The wall had spread out through slumping and collapse, explaining the extra width shown in the plan.

Entrance 7

The original discovery of the amphitheatre in 1929 revealed a segment of the outer face of the outer wall and two buttresses (Figs 188, 190). The contemporary records and photographs (Figs 6, 189) show large facing blocks on foundation rafts (p 166).

'In a length of over 30 ft (9.1 m), the wall was found to be approximately 9 ft (2.7 m) wide, with foundations of coursed sandstone blocks set in stiff clay; the plinth course was of massive sandstone blocks, and above this the wall presumably continued as coursed ... faces of smaller blockwork enclosing a rubble core, the whole set in mortar.' (Thompson 1976, 157).

Projecting elements on raft foundations only occur at the entrances to the building, and the foundations justify the use of the word buttress in this context. As will be seen below, the bases of the pilasters between entrances do not have foundations. It is thus clear that the buttresses found in 1929 were the terminals of the side-walls of a *vomitorium* which could only be Entrance 7.

Figure 188 is the original plan of the find, drawn by Lawson in 1929. Inside the north-west buttress, he shows an area of 'large tumbled rubble'. In his redraft of the plan Thompson (1976, fig 11) interprets this as 'large rubble. ?side-wall of passage', thus he also thought that this initial discovery comprised a *vomitorium*.

Figure 190 draws together evidence from the original discovery in 1929, trenches dug by Buxton in 1993 (Trenches 8, 18, 19) and by Garner in 1999 (Trench 49, Section Fig 161). The various interventions are plotted onto the outline plan for the amphitheatres created in 2015. The fit is remarkable. The different plan sources agree to within a 500 mm tolerance. It is clear that the 1929 discovery did comprise the flanking buttresses of a *vomitorium*, and that the 'large tumbled rubble' was the disturbed foundation of the west side-wall of the entrance. Buxton's Trench 8 revealed the outer face of the outer wall between the buttresses, while Trench 49 did not penetrate to Roman levels, although it contained a great deal of sandstone rubble (Garner 2001, fig 13).

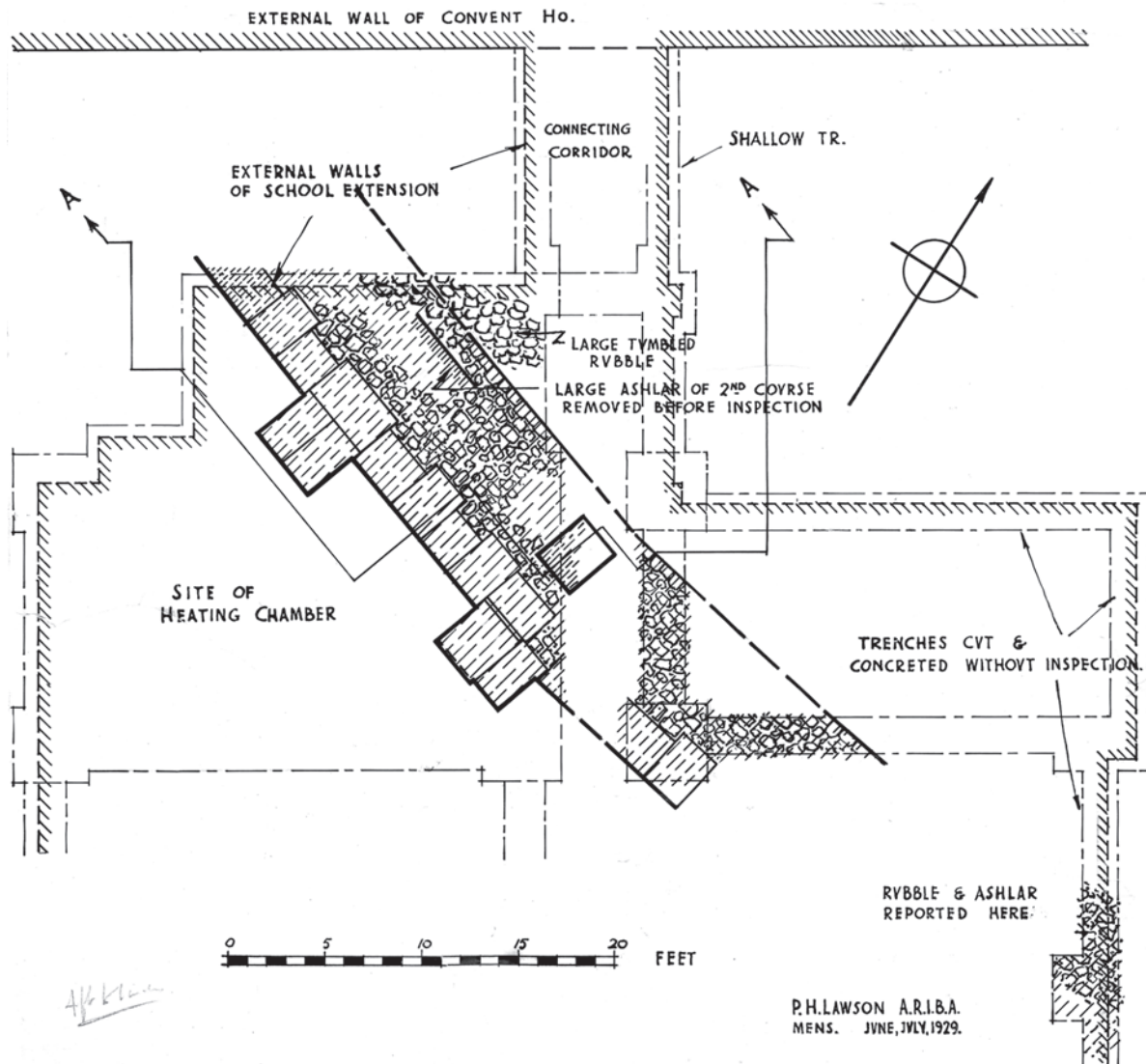


Fig 188 Plan of the original discovery of the amphitheatre in 1929 drawn by P H Lawson. The site coincided with the location of the vomitorium Entrance 7 (for section A-A see Fig 156).



Fig 189 1929 photograph of the first part of the amphitheatre to be discovered. The large blocks sit on exposed clay-bonded foundation coursing. To the right is one of the 'buttresses'.

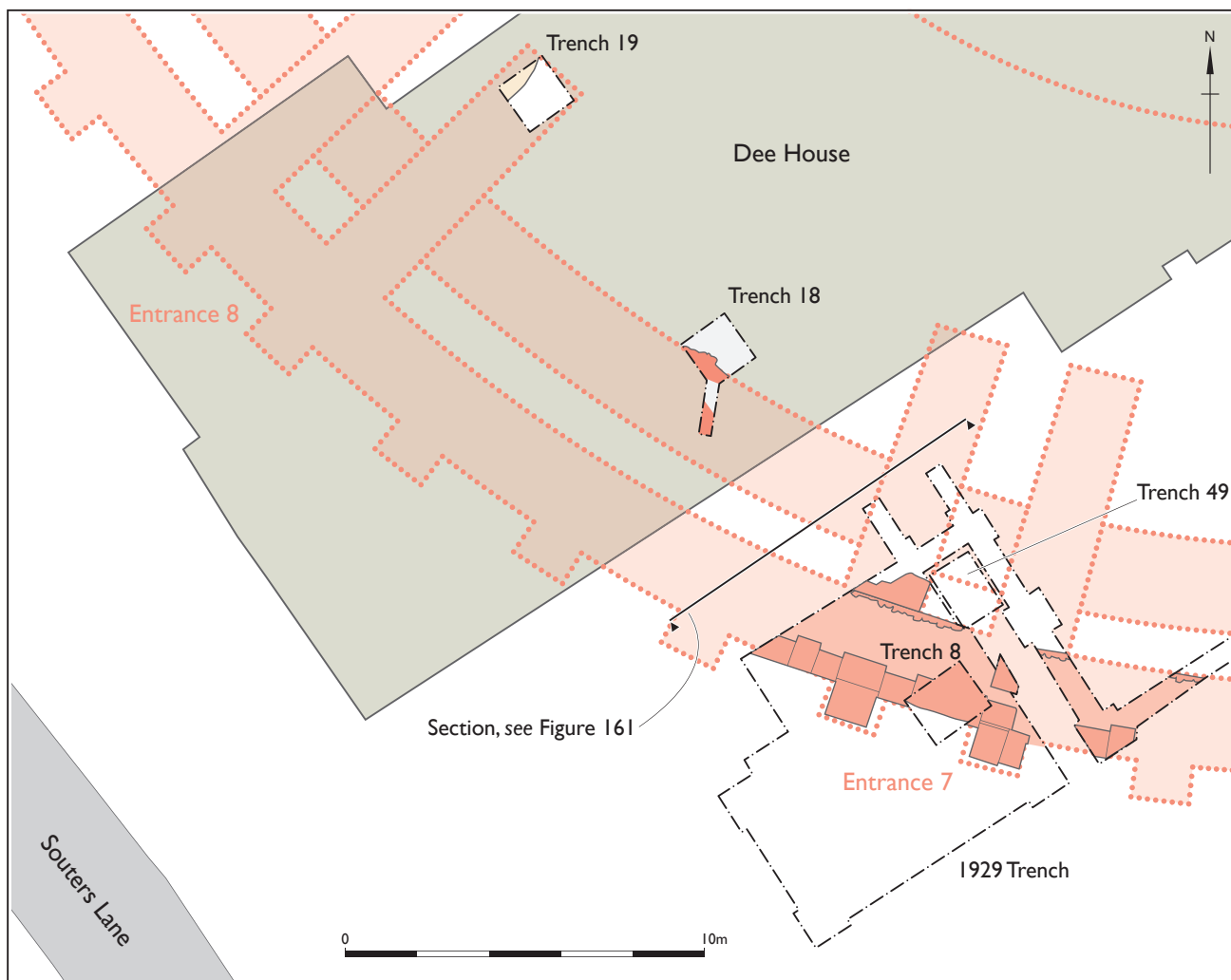


Fig 190 Plan of three generations of work around vomitorium Entrance 7 showing the 1929 trench, Buxton's Trenches 19, 18 and 8 and Gifford Trench 49 in relation to the outline of the two amphitheatres.

Entrance 8

Indications of this vomitorium were found beneath the floor of the cellar of the central block of Dee House in Buxton's Trench 19 (Figs 23, 190, 191). In this small trench measuring 1.5 m square the southern edge of a linear feature (B149) was aligned north-west to south-east. It had vertical sides and a flat base and was filled with sandstone

blocks and fragments (B150) covered with grey sandy silt (B148). The feature was cut through natural deposits (BB133, B165–B167; Fig 191). The character and position of this feature make it highly likely that it was the robber trench for the south passage wall of this entrance, although the positioning of this trench in the original report may be unreliable.

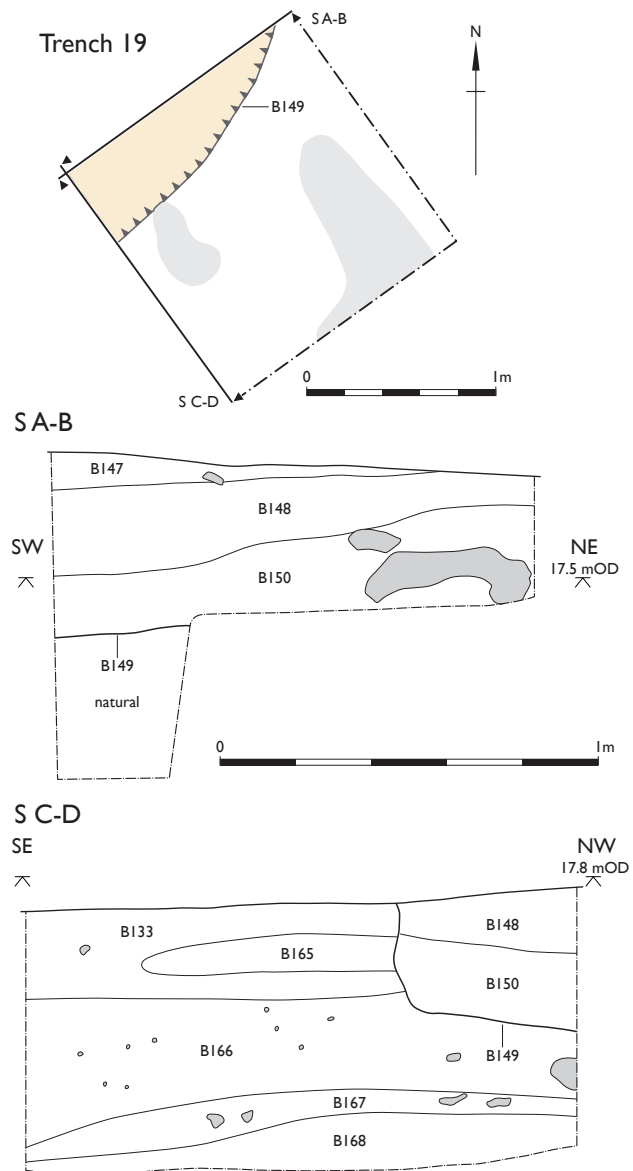


Fig 191 Plan and sections of Buxton's Trench 19 showing the probable robber trench (B149) to the side wall of Entrance 8.



Fig 192 Wall fragment adjacent to Entrance 10 as excavated in Area A, showing edge on Newstead's Trench 5. The masonry in the foreground is the outer wall of Amphitheatre 1.

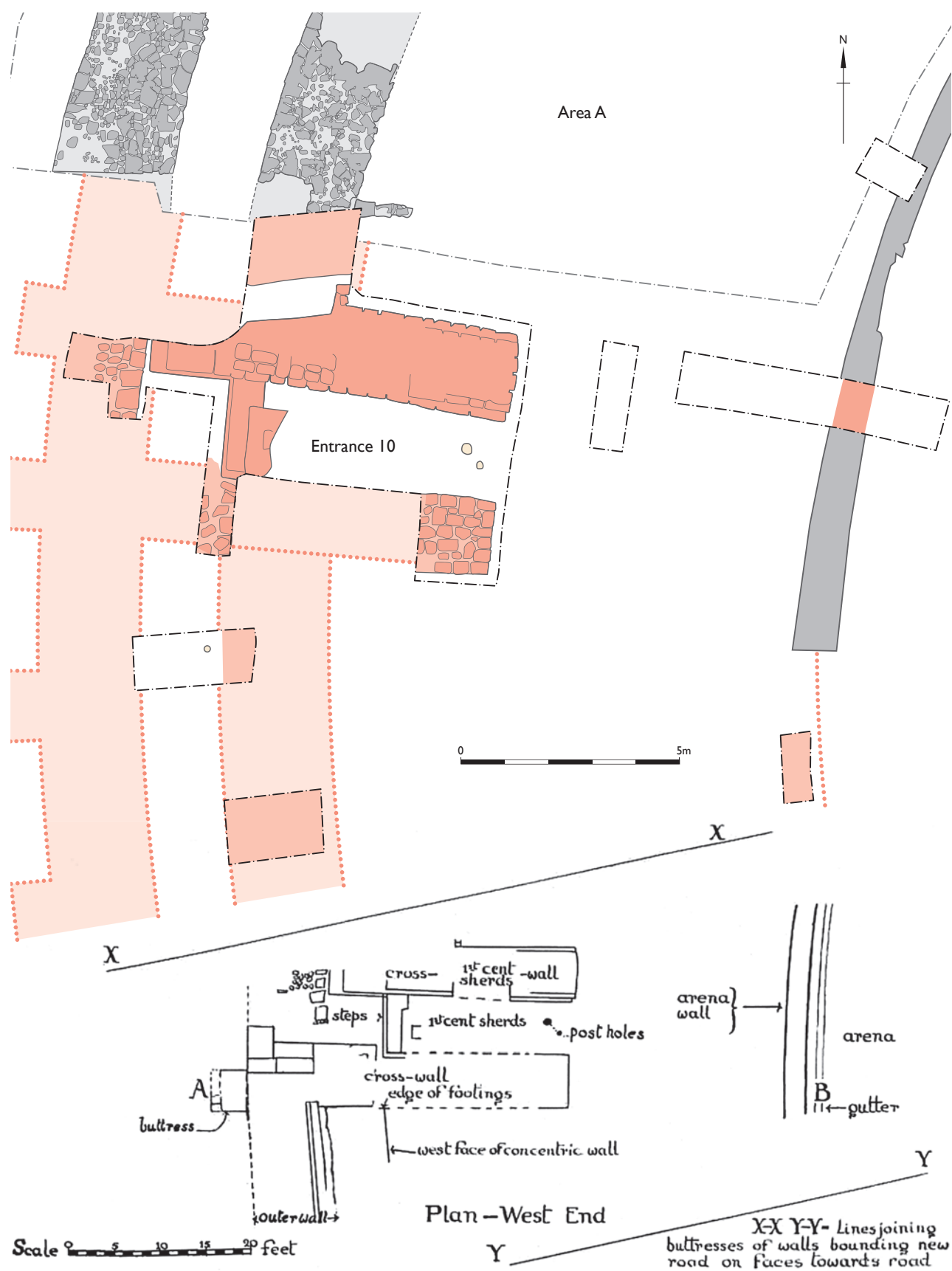


Fig 193 Plan of vomitorium Entrance 10 drawn from Lawson's original site plan of Newstead's Site 5 (Figs 12, 13) and in context with excavated walls in Area A. Inset below, the published version of the plan (Newstead and Droop 1932).



Fig 194 Excavation photos of the excavation of Entrance 10 (a and b) from the south along the line of the outer wall. (c) front view of the supposed 'step' in Entrance 10. See text for discussion.

Entrance 10

This *vomitorium* was excavated almost totally by Newstead and Droop (1932a, Site 5; Figs 12, 13). A 'considerable portion of the northern flanking wall' of this entrance was destroyed by the building of air raid shelters during World War II (JCAS 1940, 164). In Area A a tiny fragment of wall was initially thought to be a surviving fragment of this side-wall (277: Figs 152, 192), however accurate plotting of the

original excavation plan (Fig 193) shows this not to have been the case. The excavators described the entrance thus:

'An entrance six feet wide with the foundations of its parallel walls six feet thick, extending under the seating bank or auditorium to a distance of about thirty-six feet. At fifteen feet from the entrance, are two steps, and the vestiges of a 3rd, leading upwards; and beyond the steps, between the inner ends of the parallel walls, are two post-holes. The floor of the entrance is practically level as far as the steps, and just inside it is partly paved with four massive blocks of sandstone, none of which however shows any trace of either wearing or weathering.' (Newstead and Droop 1932, 14–15).

A fragile original plan and sections drawn by P H Lawson have recently been located in the Grosvenor Museum, and the plan is re-drawn at Fig 193. Lawson's plan can be properly located, as several modern walls that he includes appear on the contemporary OS map. It is therefore possible to merge the plan with the plan of Area A. Figure 193 also reproduces the published plan included in the Newstead and Droop (1932a) report. This shows that the Lawson plan is only partial, and that they also recorded part of the outer wall, including the southern buttress of the *vomitorium*.

The supposed steps on the line of the outer wall of Amphitheatre 1 have been very influential in previous reconstructions of the building. Given the evidence from the rest of the building, however, it is apparent that these cannot have been steps unless this *vomitorium* was radically different from the others. A comparison of the contemporary photographs in the Newstead archive allows a reinterpretation of the evidence.

Figure 194a is viewed from the south along the line of the inner face of the outer wall. To the left of shot the outer face of the wall has been robbed to below the level of the masonry of the inner face. It seems likely that the stones removed were large foundation blocks like those recorded in 1929 at Entrance 7. This pattern of robbing closely resembles that in Area A (Fig 153) and is probably another example of the large outer wall foundation blocks being selectively removed (p 166). To the left of the robbed area are the foundations of the southern buttress of the *vomitorium*. The large flags mentioned by Newstead run across the line of the outer wall foundations. To the right of shot, behind the unexcavated area, are the 'steps'. The deep hole in the centre of the picture seems to be a sondage to investigate the depth of foundations of the outer wall. Figure 194b is viewed from the same direction. Here the outer wall of Amphitheatre 2 is to the left of shot, and five courses of the outer face of the wall of Amphitheatre 1 appear to the right. In the background are the 'steps'. It is clear from this photograph, however, that the uppermost of the five courses of the earlier wall is the same course as that below the offset 'step'. Furthermore the top of the fragment of earlier wall in the foreground appears to bear the imprint of an offset course, the line of which matches that of the 'step'. The two portions of this wall are separated by a robber trench



Fig 195 Plan of vomitorium Entrance 11 in Area A.

for the side-wall of the *vomitorium*. Figure 194c shows a front view of the 'step', and from this image it is clear that it is simply an offset in the outer wall of Amphitheatre 1. The two-foot boxwood rule used as a scale shows the upper three courses of the lower 'step' to be some 18 inches (0.46 m) high. As noted above (p 77) the coursing of this wall is irregular, however four courses in Area A measured up to 0.64 m high, and the five courses shown below the offset in Fig 194b would be in the region of 0.84 m; far too deep for a step. It is significant that nowhere else, even in Area A or Matthews' Trench XII (Figs 50, 51, 57), has the earlier outer wall survived above four or five courses, so how typical this offset is of the circuit cannot be gauged; it may have been a localised correction in construction if the foundations ran off-line, for instance. Finally, the offset shows no sign of wear unlike the real steps in Entrance 2.

Entrance 11

As at Entrance 2, only the portion of this *vomitorium* within the line of the outer wall of Amphitheatre 1 was excavated by Thompson. The rest was excavated in Area A (Figs 152, 195, 196).

The *vomitorium* was poorly preserved, with the southern side-wall entirely robbed away, along with part of the outer wall of Amphitheatre 1 in a cruciform robber trench (245). The northern side-wall was better preserved and even retained some facing stones at the outer end where it also incorporated the possible earlier structure (p 139). Linear construction trenches (690, 656) (Fig 135) were excavated across the area outside Amphitheatre 1 for the outer section of this wall (711) which was bonded with the outer wall, but also butted the outer wall of the first building (712) (Fig 197). There was no indication of how high the earlier wall stood. It is most likely that it survived to the same height



Fig 196 Photograph of *vomitorium* Entrance 11 in Area A.



Fig 197 Butt joint between northern side wall of Entrance 11 and the outer wall of Amphitheatre 1.



Fig 198 The northern projecting buttress of Entrance 11. (a) viewed from the south-east, (b) viewed from the north-west, (c) viewed from the south showing the tooling on the upper surviving stone.

as in Entrance 10. Inside the line of the earlier wall only the lowest foundation of the side-wall survived (195).

The northern of the two projecting buttresses flanking the entrance was the better preserved, the southern having become rather spread out through collapse, robbing, and the fact that a modern sewer pipe was cut through it. The northern buttress was 1.66 m wide and projected from the wall face by 0.96 m (Fig 198a, b). The upper surviving



Fig 199 Threshold block of Entrance 11. The stonework on top of the block is a later wall and not a step, however it respects the setting-out line which can be seen to each side.



Fig 200 Pilaster bases in Area A. (a) complete base (1037) comprising two blocks. Note the mortar pad, and fissures in the blocks. (b) half base (1032).

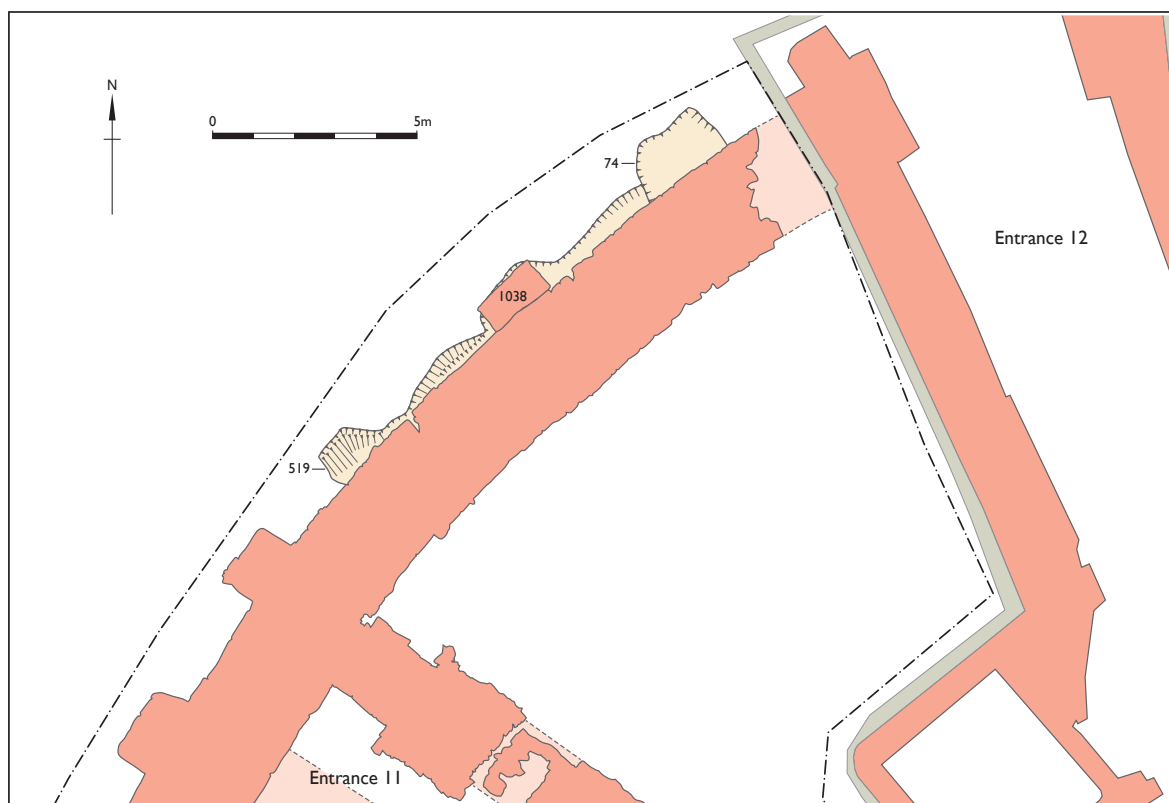


Fig 201 Outline plan of the outer wall between Entrances 11 and 12 in Area A showing surviving pilaster base and probable positions of robbed pilaster bases.

stone facing into the entrance passage displays identical rough tooling to the large blocks in Entrance 7 and on the outer wall found in 1929, which were not intended to be seen (Fig 198c), and this block is indeed entirely beneath the finished surface level of the entrance.

The entrance between the buttresses measured 2.90 m in width. The threshold comprised large slabs placed over the continuous footings of the outer wall. As in Entrance 11 these slabs showed no signs of wear, as they were never a walking surface but the base for the *vomitorium* stair. On the leading edge of the slabs, set back from the edge by 0.31 m, a clear setting out line was pecked into the surface of the stone to mark the intended position of the bottom step (Fig 199). The top of the threshold lay at a level of 18.5 m OD

The Pilaster bases

Thompson (1976, 157–159, fig 3) reconstructed the amphitheatre as having buttresses all the way round the outer wall, with two flanking each entrance and a further four between each pair of entrances. A glance at his plan, however (Fig 19) shows that the buttresses he was sure of flanked entrances, the rest being marked either as ‘inferred’ or ‘robbed’.

We have seen that substantial buttresses with deep foundations flanked both the principal entrances and the *vomitoria*. Intermediate features however were of a very different character, being relatively insubstantial. The best preserved of these lay equidistant between Entrances 11 and 12 in Area A (Figs 153, 200a). Butted against the outer face of the foundation, with their bottom surface level with the top of the clay-bonded foundation, were two sandstone blocks (1038) set in a foundation cut (1037). The two blocks together measured 1.70 m long against the face of the amphitheatre wall, were 0.28 m thick, and projected 0.80 m from the wall line. The top surfaces of the blocks were carefully tooled to a very fine level surface. On top of the foundation formed by the blocks was a pad of yellow-

white mortar measuring 0.90 m along the wall face, and projecting 0.45 m. The insubstantial nature of its foundation suggests that the block had supported a decorative element on the façade of the amphitheatre, most likely a pilaster. The curved shape of the mortar pad originally suggested that the external decorative scheme featured half-round engaged columns, though this has seemed increasingly unlikely given the absence of other evidence. The fact that the sandstone blocks were fissured around the mortar pad demonstrates that the pad had supported a weight that had exerted pressure on the blocks, fracturing them. The even measurement of the pad, with the projection exactly half the length against the wall suggests a pilaster measuring 0.90×0.45 m. The upper face of the pilaster base was of a consistent level (18.50 m OD) with that of the threshold of Entrance 11.

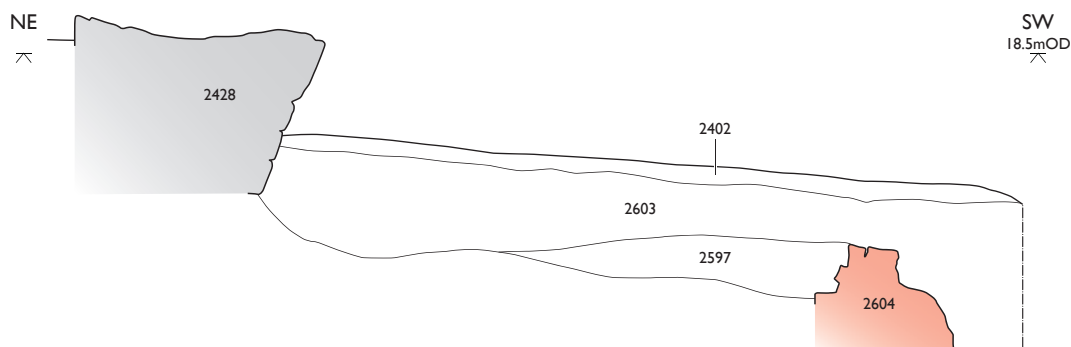
In an analogous position, midway between the *vomitoria*, Entrances 10 and 11, lay a similar, though less well preserved pilaster base (1032, Fig 200b). Importantly, it was clearly demonstrated in this case that the base had been placed directly onto earlier surfaces, and had no foundation. It comprised a single block measuring 1 m long against the face of the wall, 0.28 m thick and projecting 0.85 m from the wall line. The block was packed into its foundation with clay infill (1257). It was broken on its northern edge, and any second block had been robbed away. The surviving mortar pad measured 0.80 m along the wall face and 0.45 m deep. The projection of the block from the wall face and the radius of the mortar pad were thus identical to those on pilaster base (1038), and we must assume that the other dimensions were also originally similar. The surviving block would have been the northern of the original pair.

Although the surviving bases are both equidistant between pairs of entrances, any decorative façade with a single pilaster across such an expanse of wall would look frankly ridiculous. Analysis of site records strongly suggests that there were originally three such pilasters between each pair of entrances. This was demonstrated between Entrances 11 and 12 (Figs 152, 201). Pilaster base (1038) was situated at the midway point between these entrances. Midway between (1038) and Entrance 11, however, the robber trench for the outer wall (519) kinked outward, suggesting that a pilaster base block had been robbed here. Similarly, midway between (1038) and Entrance 12, one of Thompson’s deep trial excavation pits in which he records a ‘buttress’ (74) occupies the point at which a pilaster base would have been located. This sondage penetrates to the bedrock (Fig 154) and there was no scar for an engaged buttress on the foundation courses of the wall. Thompson gives no reason for locating a ‘buttress’ here, and on his plan it is shown as robbed. It is suggested that there was some trace of such a structure that was removed during the earlier excavation, as the even spacing is otherwise too coincidental.



Fig 202 Top of the arena wall as exposed in Area B.

S 6203/4



S 6202

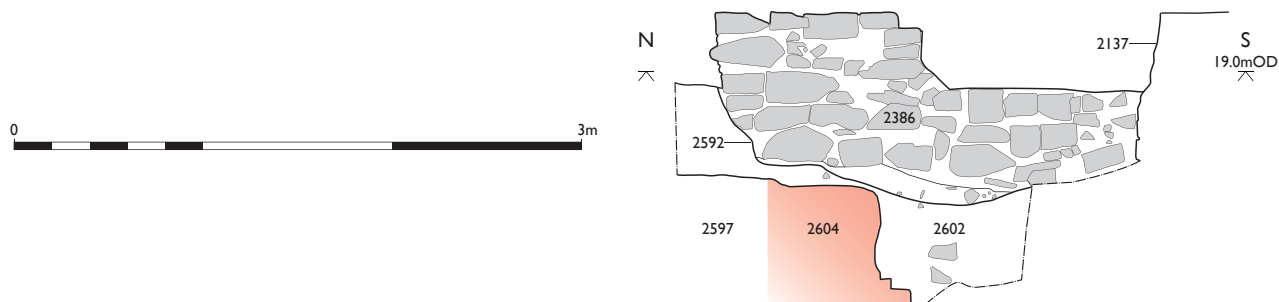


Fig 203 Sections S6203/4 and S6202 across the Arena wall in Area B (for locations see Fig 170).



Fig 204 Arena wall coping stone.

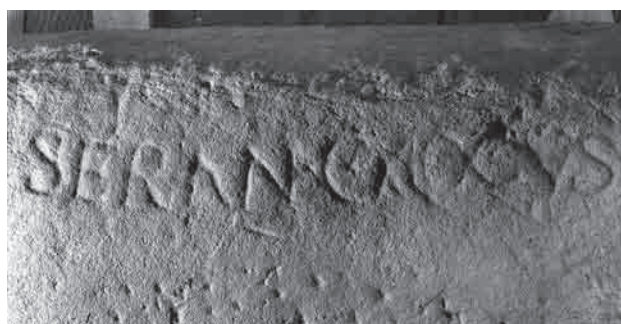


Fig 205 Coping stone with the inscription 'SERANO LOCUS'.

The arena wall and arena

The surviving arena wall on the western side is described above (p 124) as a feature of Amphitheatre 1b. On the northern and western side of the amphitheatre the wall follows closely the line of the primary arena oval (p 156), however on the eastern side there is a distinct bulge, broadening the arena on this side (Fig 151). It seems that this eastward distortion was the result of the construction of the major northern and eastern entrances. Inserting these entrances would have required the demolition of a substantial segment of the pre-existing arena wall, as well as the obliteration of the outer wall of Amphitheatre 1 and the removal of a large quantity of seating bank material. It would be unsurprising if the reinstatement of the arena

Area C

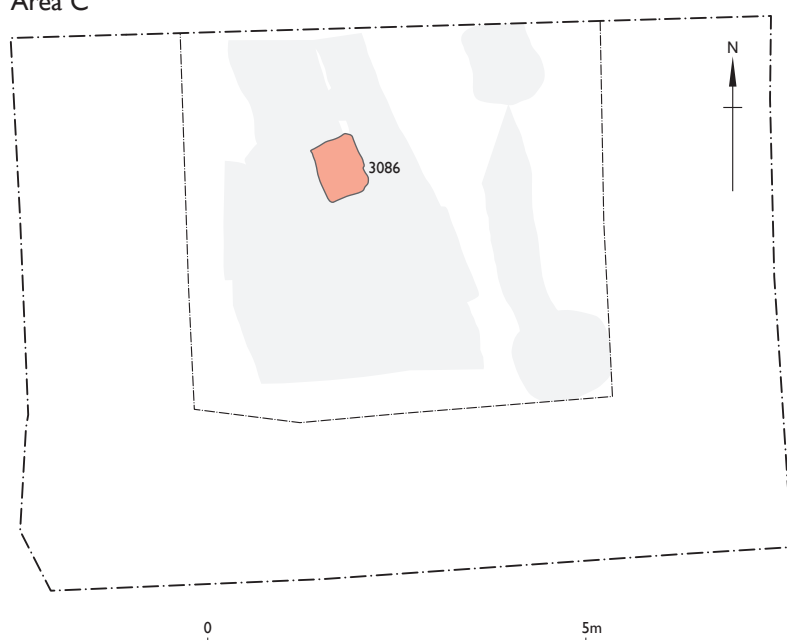


Fig 206 Plan showing location of tethering stone in Area C, and photo of block.

wall to accommodate the new entrance caused a variation in the ideal shape of the arena. Though this distortion is clear in plan it would have been invisible to the users of the amphitheatre. Because of this distortion, the arena wall found in Area B is now attributed to Amphitheatre 2.

The arena wall

Two sondage trenches were excavated through a series of medieval deposits of Phases 12 and 13 (see volume 2 of this report), and seating bank deposits of Phase 6 (2597), in order to locate the arena wall, if it stood to any height (Fig 170). The uppermost surviving part of a section of the wall (2604) was exposed and traced for a length of 6.65 m (Fig 202). It formed a curvilinear line parallel to the outer wall (2462). The top 0.7 m of the wall was exposed. The arena wall had been constructed as a retaining wall with an outer face comprising a single skin of neatly shaped small sub-rectangular sandstone blocks (up to $360 \times 170 \times 120$ mm). To the rear of this outer face was a rubble core of sandstone fragments; the entire structure was bonded with very pale brown hard sandy-lime mortar with *c* 40 % pea grit and fine gravel inclusions. No traces of lime render or paint were detected on the excavated section of the wall's outer face.

Comparison of levels between the top of the surviving wall (18.47 m OD) and exposed areas of the arena floor in Area C (16.10 m) would suggest that the arena wall survived to a height of some 2.27 m in Area B, comparable to the height of 2.85 m encountered by Newstead to the west of the north-west quadrant of the amphitheatre. The bottom 2.17 m of this section retained its facing stones (Newstead and Droop 1932a, 16–18; Thompson 1976, 146).

Between the sondages in Area B there was no trace of the wall. It is likely that here, as in the northern half of the arena, the wall has been either removed in later digging, or has collapsed forward into the arena (*cf* Thompson 1976, 146). A small area of the seating bank deposit was exposed during the excavation of the section of arena wall (2604). Here location the seating bank deposit (2597) was a sterile pale brown coarse sand which slumped into the robber trench for the arena wall (Fig 203).

The general sophistication of Amphitheatre 2 suggests that the coping stones placed on top of this wall date from this phase. These 'varied in length' but averaged about 3 ft (0.91 m) and had a simple semi-circular profile with a radius of *c* 10 in (25 cm).' (Thompson 1976, 148) (Fig 204). Two of these bore inscriptions, one of which read SERANO LOCUS (below p 207: Fig 205). Given the rebuilding of the arena wall in the area of the east entrance, the painted and plastered facing to the arena wall would have been renewed in this phase.

The arena

The peripheral drain may have gone out of use, as Thompson shows it terminating north of the main east entrance (Fig 20). The 'axial' drain recorded by Thompson may have replaced it, as this is an integral feature of the main north entrance (Entrance 12). Thompson assumed that the central drain in Entrance 12 communicated with the peripheral drain. If the latter was out of commission then the axial drain across the arena was the continuation of the drain through Entrance 12. It was shallow, and fell from north to south (Thompson 1976, 152). It measured 0.61 m in width. Thompson did not note the depth, but

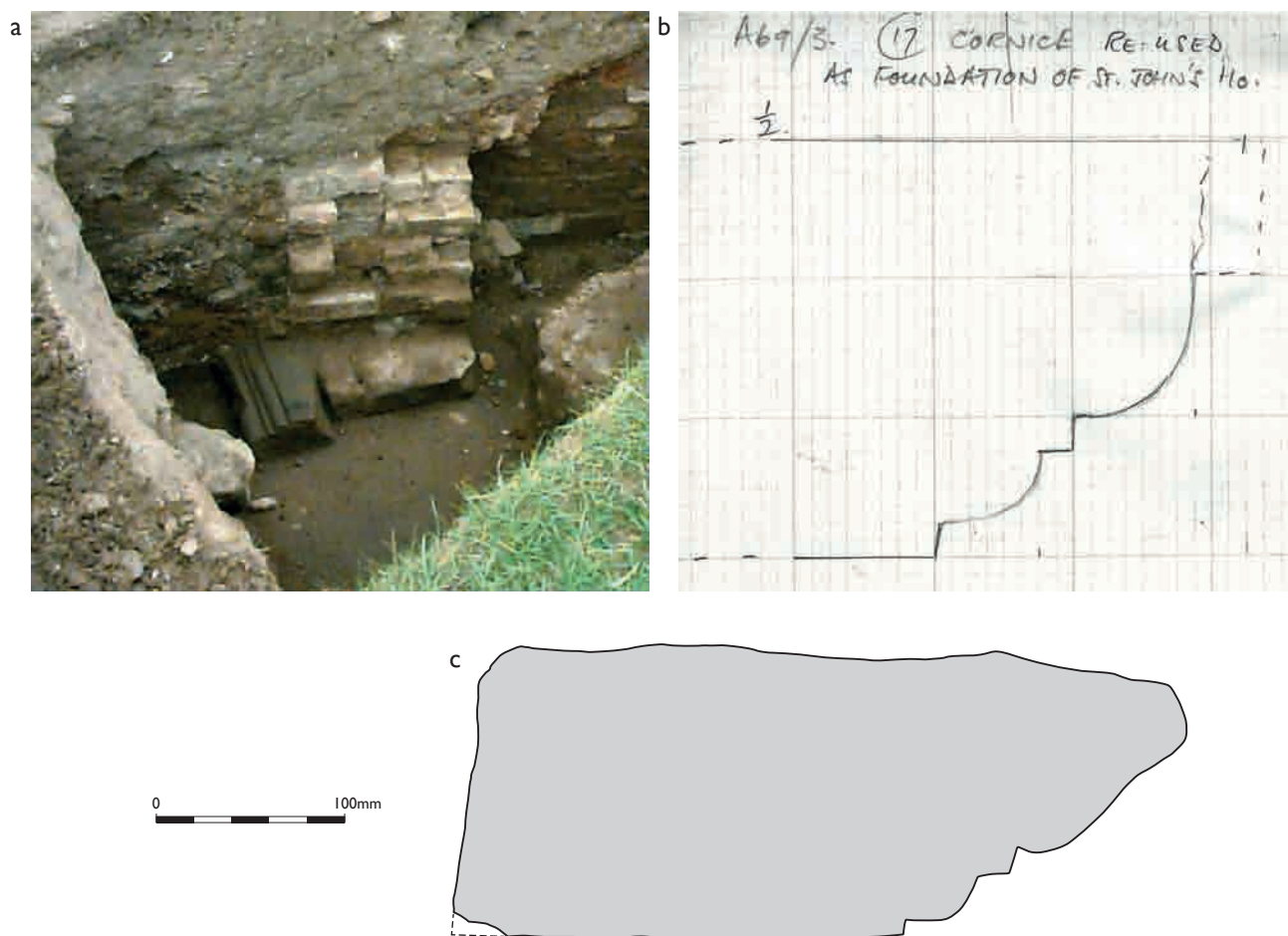


Fig 207 (a) Excavation photo of Matthew's Trench VIII showing cornice fragment reused in the foundations of St John's House. (b) Sketch from Thompson's site notebook of the profile of a cornice fragment. (c) Profile of cornice fragment found in Area A.

where the drain met the central concrete retaining wall Keith Matthews (2003) excavated a trench (Trench I) which crossed its line (M84, Fig 151). At this point it was 0.45 m in depth. Thompson recorded the drain running axially for some 15 m, then turning to the west at a 15° angle. Thompson was of the opinion that the drain veered to avoid a timber structure in the centre of the arena, but this can be discounted, as the structure is now interpreted in terms of an early post-Roman re-use of the arena (p 434 and Volume 2 of this report). If the drain continued south of the modern retaining wall its course was obliterated by features of this reuse phase that were excavated in Area C. It is feasible that it did, in fact, discharge through the south entrance, and it is possible that it is represented by a stone-lined Roman drain or culvert recorded in Trench 48 (Garner 2001; Fig 139, G211)

In Area C, an important feature occupied a position very close to the measured centre of the arena. This was a large stone block (3086, Fig 206) measuring $0.85 \times 0.58 \times 0.23$ m was set directly on top of the natural bedrock of the arena floor. At the centre of the block were two iron projections fastened into the surface of the stone with a plug of lead.

Cracks running radially from the central plug suggest that the block had been under stress. The area around the block had been so heavily disturbed by later activity (p 434) that it was impossible to establish any stratigraphic context. On removal of the stone block it was seen that it sealed an earlier timber post-setting. The central position of this block strongly suggests that it was a primary feature of the arena in this phase.

Architectural stonework

In 2000, in his Trench VIII, Matthews recovered a piece of decorative cornice which had been reused in the sandstone footing course for the brick walls of the 18th-century St John's House (Fig 207a; for St John's House see volume 2 of this report; Matthews *et al* 2001c, 39–40). The stratigraphic position of the stone clearly shows that this was not part of the ornamentation of St John's House, and photographs of the building show no trace of any similar cornice. Matthews *et al* (2001c) noted that Thompson had found an identical moulding or mouldings reused in the linings of the drains to St John's House. Although no

illustration of the mouldings was published, Thompson's sketch in the site notebook shows an identical profile to that recovered by Matthews (Fig 207b). Thompson also found a date-stone of 1664 reused in the drain, and concluded that the date-stone and mouldings both came from a 17th-century building;

'It seems probable that an earlier house stood on the site, since drains for St John's House included fragments of seventeenth-century mouldings and a dated building stone of 1664' (Thompson 1976, 165).

He does not say how many fragments were found. Although Matthews found further evidence to demonstrate that St John's House was built on the site of an earlier 17th-century building, he points out that there are no parallels for such a moulding on 17th-century buildings in Chester, and in any case this would be a century too early for such mouldings to appear generally in the canon of domestic architecture (Matthews *et al* 2001c, 40). It seems that Thompson's interpretation was swayed by the date-stone. The conclusion is clear. The decorative moulding was a feature of the amphitheatre façade.

The cornice fragment(s) found and sketched by Thompson and that found and recorded by Matthews were augmented in 2004 by the discovery of a further piece discovered in collapse rubble in Area A close to Entrance 12. This was of the same profile as the previous finds and was clearly from the same cornice.

Fig 207c Sandstone cornice fragment measuring $0.38 \times 0.38 \times 0.14$ m overall. There are traces of a projecting fascia at the top measuring 30 mm deep above a *cyma recta* 60 mm deep. Below this is a fillet 10 mm deep above a further *cyma recta* 30 mm deep and a lower fillet 12 mm deep. The underside retains a patch of hard white mortar identical visually to that used in the standing inner face of the outer wall of Amphitheatre 2. This is set back 25 mm from the face of the stone. The upper surface is thickly coated with a coarser mortar containing organic inclusions. This is very different from the mortar on the underside and strongly suggests that the piece has been reused. A (001): Phase 13–16, demolition rubble.

The 2004 fragment is smaller than that found by Matthews, which measured $0.55 \times 0.35 \times 0.14$ m. The slight difference in the breadth of Matthews' find is due to the fact that on that piece (and on that sketched by Thompson) the upper fascia has been chipped off, leaving the upper *cyma recta* as the top surviving element. Matthews *et al* (2001c, 40) compared the profile of this cornice and that on the city wall, pointing out the similarity between the two, despite the disparity in size. The recognition of the upper fascia element makes this comparison even more valid, as the city wall cornice has a similar feature (Blagg 1999, 110).

Finds and dating

By Gillian Dunn, Alison Heke, Quita Mould and Tony Wilmott

Finds from this phase come from the construction trenches for the building of the amphitheatre. The material is entirely residual, probably deriving from the earlier deposits through which these trenches were cut. Pottery (pp 296–7) was all of the late 1st–2nd century, the latest being a small body sherd of Dorset BB1.

Fragments of sheet and strips of lead were recovered from the fill of the foundation trench for Amphitheatre 2 in Area A (653, 687), which is further evidence for the material being derived from building activity, deposited along with mason's waste and chippings. A ?plug or cap of lead was recovered from the fill of one of the linear construction trenches for the *vomitorium* Entrance 11, outside Amphitheatre 1, context (601) (Func Cat no 260). 488 fragments (6,160 g) of Roman CBM came from nineteen contexts in Phase 8. Identifiable forms comprise roof tile, brick and box-tile. Small indeterminate fragments form the bulk of the assemblage. A Warry group A *tegula*, dated between *c* AD 100–120, was recovered from (554). There were also two fragments of vessel and one of window glass, a small copper alloy piece from *lorica segmentata* from (678) (Func Cat no 25) and a unit from a bone hinge, probably from a piece of furniture from (686) (Func Cat no 124). Very little iron came from contexts of this phase – only 7 hobnails were recovered.

Dating for the construction of the second amphitheatre is a major problem. Deposits which were cut by the outer wall foundation yielded two sherds of Dorset BB1 from the deposits of Phase 7 and one further such sherd from the fill of the construction trench of Amphitheatre 2. This is supplemented by the samian ware bowl sherd from deposits of Phase 5 (1152) and the sealing deposit over pit (1256), which dates to *c* AD 90–110 (or if made at Banassac, *c* AD 110–150). This deposit to the west of Entrance 11 was overlain by a fine road surface (1028), which was also the level from which Amphitheatre 2 was built (above p 130). The latest closely dateable material from the deposits of Phase 7 consists of Central Gaulish samian ware sherds from Les Martres-de-Veyre, made within the range *c* AD 100–125 (p 255). The road sequence recorded between Entrances 11 and 12 (below) was well preserved and studied in detail. The make-up layer (1011) for the first Roman road outside the outer wall of Amphitheatre 2 produced a Warry group C *tegula* (p 361) dating to *c* AD 160–260. This single fragment may provide a reliable TPQ for the building of the amphitheatre, although the date is tentative (p 357: Warry 2006, 64; pers com M Fulford). Amphitheatre 2 is therefore cautiously dated by analogy to events within the fortress, where in the early 3rd century, a major recommissioning, including the completion of the Elliptical Building, took place (p 7).



Fig 208 Fragment of inscribed column with iron peg attached found in the arena by Thompson.



Fig 209 Thompson's photograph of the rough paving in the arena. Note the reused architectural fragment.

AMPHITHEATRE 2 USE (Phase 9)

The exterior

During the lifetime of Amphitheatre 2 a sequence of road make-up layers and surfacings, with occasional small patches were laid around the outer wall of the building. Because of later truncation by robber trenches, pits and mains services, stratified sequences of surfaces appeared on islands between intrusions. They have been equated by comparing levels on successive surfaces, and the sequence is clear. The best and most complete sequence was undoubtedly that between Entrances 11 and 12 (Fig 152).

The road comprised a deposit of sandstone and cobbles with sand and pebble (1011=1013=998) laid as a levelling deposit for a fine, very hard and compact pebble surface (1010=1004=998). This became worn, and was subject to subsidence above the soft fill of Phase 5 cess-pit (1078), and required further surfacing, again comprising larger material (1009=972=994) acting as levelling for a fine surface (967=994). A 3rd re-laying of the road (make up, 980, 984=993; surface, 979, 983) followed. After this a series of three repairs to this surface took place in the area over cess-pit (1078), which was subject to subsidence (973, 974, 975), with a further patch laid in a worn spot (996). Similar patching took place over cess-pit (1256). A fourth and final general resurfacing (make-up, 970=874; surface, 824=873) took place following these repairs. It must be assumed that these roads, representing a total accumulated depth of 0.57 m would have extended up to the amphitheatre wall, and would also have buried the bases of the pilasters.

The arena

The latest deposits in the arena to be recorded by Thompson were at an arbitrary level determined by the depth to which overlying stratigraphy was machined unrecorded. Thus there was no recorded interface between deposits in the arena relating to the use of the space and those reflecting change of use or disuse. The recorded deposits were simply the bottom 0.61 m of the arena 'fill' (Thompson 1976, 150).

Evidence for the use of the arena for the purpose for which it was designed was sparse indeed. Certainly the best such evidence was the stone block in the centre of the arena which has already been described (p 191). There is little doubt that this served as a tethering block to be used during wild beast spectacles, and that it served to keep the animal in the centre of the arena, to prevent it going to bay against the arena wall, cutting off the view for a large part of the audience, as well as to keep the audience safe in the absence of internal fences or nets (Jennison 1937, 158). It seems probable that the post-hole found beneath this block when it was lifted was its functional predecessor.

Within Area C the arena flooring associated with the block had been cut away by intensive later activity (below p 434, Volume 2 of this report). It was not even apparent whether the block had been cut into the natural bedrock of the arena. However, it is clear that when in use the block would have to have been buried in arena sand so as not to be visible. A depth of sand of 0.25 m would have been required to achieve this. Thompson (1976, 150) recorded a consistent deposit of yellow-brown sand 0.15 m thick laid across the natural sandstone and a similar deposit was recorded by Newstead and Droop (1932a, 19).

Thompson's excavations revealed two further pieces

of similar possible arena furniture (Thompson 1976, 153). Adjacent to the threshold of the north entrance was another square stone block 0.53×0.61 m in plan, with a square section iron bar leaded into its surface (Fig 177). At a distance of 12.4 m along the central axis of the arena, and laid lengthways in a shallow pit cut into the bedrock, was a section of a reused column drum measuring 0.68 m long and 0.33 m in diameter. This had been chiselled flat on its upper surface (partly erasing an inscription [...]*JURRICI* (RIB III, 3158: the editors of RIB suggested that this was a coping stone, however the diameter is significantly smaller than other copings, and it is more likely that this was a cut-down column drum as suggested by Thompson (1976, 184)). Again a square-section iron bar had been leaded into its surface (Fig 208).

It seems at least possible that the three stone ‘anchors’ in the arena may have been used together during spectacles, perhaps to tether a number of animals across the centre line of the arena. In order to level the arena to the surface of the tethering stone the sand in the arena would need to be some 250 mm deep. This is the same depth as mentioned above (p 160) required to level up to the threshold of the *Nemeseum*, and can be regarded as a general requirement throughout the active life of the building.

Thomson (1976, 150) described the consistent sand deposit as the ‘primary’ floor of the arena. The evidence from Area A in Phase 7 shows that sand was brought in and removed from site at different times, and it is therefore likely that Thompson’s sand was, in fact, the *latest* such deposit to be laid down in the arena before the amphitheatre fell into disuse.

Above the sand, Thompson (1976, 150) found a layer of 0.30 – 0.45 m depth of ‘dark loam’. This material was paralleled by similar deposits identified in the arena by Newstead and Droop (1932a, 36–7) on their Site 2. Finds from this deposit, in both excavations included a large number of ‘meat bones’, 3rd-century pottery, and a number of coins, seven from the Newstead work and eight from Thompson (Kent 1976), but sharing a *terminus post quem* for the groups of AD 270–74, represented by coins of the Tetrici. These apparent abandonment deposits in the arena, were followed by the laying of stone surfaces, including fragments of architectural *spolia* (Fig 209). These stone surfaces, interleaved with some clay surfaces and traces of burning, survived patchily, but were interpreted by Thompson (1976, 182) as representing a late 3rd-century recommissioning of the amphitheatre following a period of desertion. It is highly unlikely that the stone surfaces represent a renewed use of the arena for the purpose for which it was designed, as the rough and patchy stone surface would have been wholly unsuited to amphitheatre spectacles. Matthews (2004, 19) has gone further in suggesting that sand might have been laid above the stone surfacing to allow spectacles to take place, and that this sand was removed either over time or through Thompson’s machining operation. This however seems to be special pleading. It seems a more likely interpretation of these deposits simply to conclude that the

dark soil represents a period during which the amphitheatre was disused, and that the building fell out of use in the late 3rd century. The 3rd-century coins provide a *terminus post quem* for the stone surfaces, but these may have been laid at a much later date. This issue will be examined in the second volume of this report.

Finds and dating

By Gillian Dunn, Alison Heke and Tony Wilmott

The pottery assemblage (51 sherds) from this phase included only residual late 1st – early 2nd-century wares recorded from earlier phases, with sherds of Wilderspool and Dorset BB1. 270 fragments (4,822 g) of Roman CBM were recovered from eighteen contexts, mostly in road make-up levels. Identifiable forms comprise roof tile and brick. A single piece of *cuneatus* was also retrieved. As with all the other Roman phases, small indeterminate fragments predominate. As noted above (p 193) a Warry group C *tegula* from (1011) may provide a *terminus post quem* of c AD160–260 for the make-up layer of the first Roman road outside the outer wall of Amphitheatre 2, although Warry’s date (2006, 64) for this type is tentative.

The evidence of coins found in the dark soil within the arena by Thompson and Newstead would appear to indicate that the building became disused in the late 3rd century

AMPHITHEATRE 2: STRUCTURAL RECONSTRUCTION AND DISCUSSION

In 2010, when work on this report was well under way, it was decided that a bronze model of Amphitheatre 2 should be created for display on site. This led to the commissioning of Julian Baum to prepare the reconstruction drawings from which the model would be made. The project required a great deal of input from specialists, especially Peter Carrington and the principal authors, who engaged in intensive discussion and the exchange of ideas on the reconstruction of the building. The resulting document (Baum 2010) served as the basis for the model which now forms part of the interpretative display on site (Fig 224f). Our subsequent work on the analysis of the archaeological evidence for the building, particularly in the realisation of the importance of the steps in Entrance 2, however has required the earlier work to be extensively modified.

Despite the fact that the amphitheatre has been comprehensively robbed of stone down to, and in places below its foundations, it is possible with the archaeologically recovered data to arrive at a convincing evidence-based reconstruction through the techniques of computer modelling. We have been careful in the analysis to be led by the archaeological evidence alone, and not to allow preconceptions, assumptions or expectations to colour our conclusions.

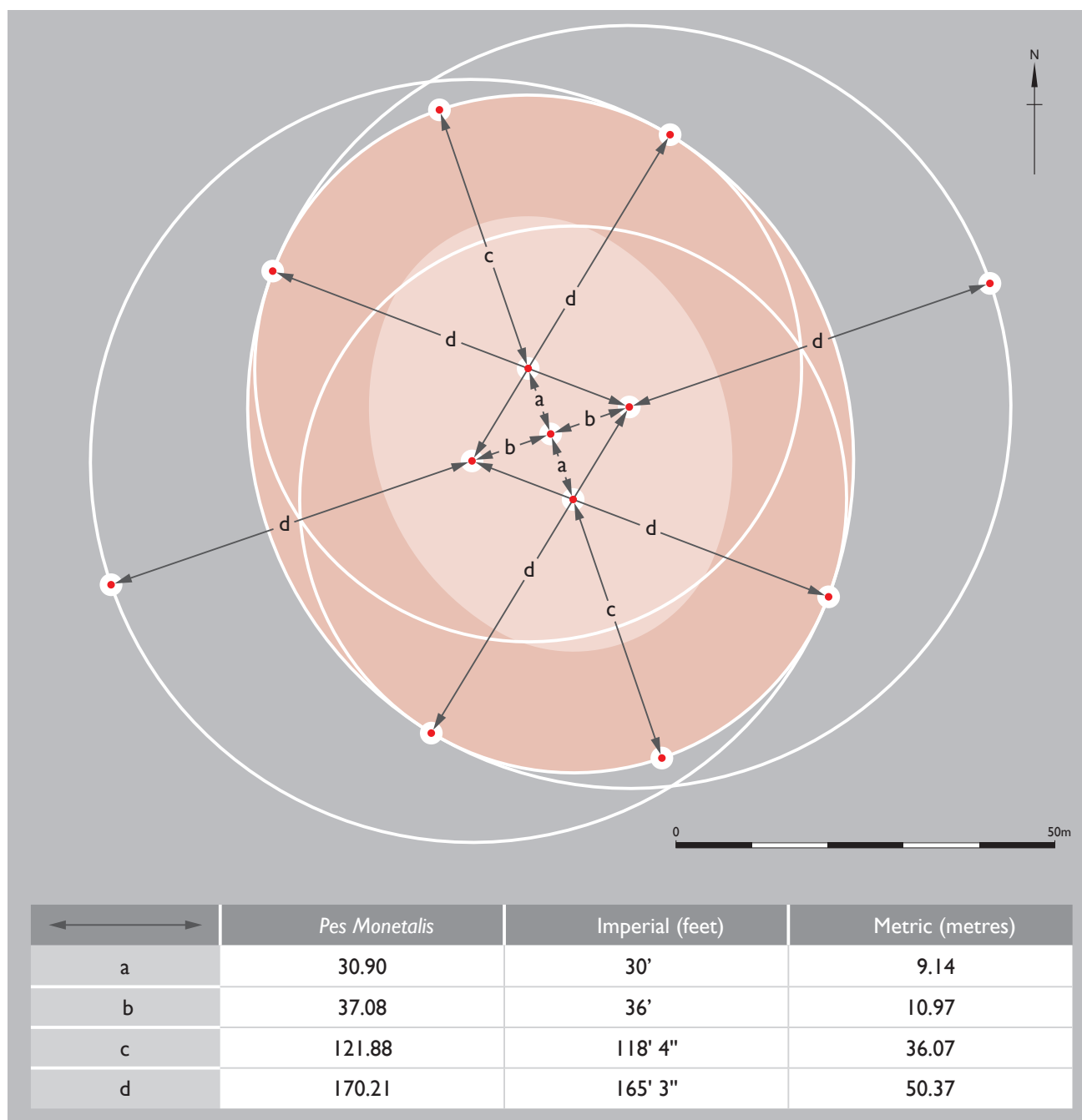


Fig 210 Measured reconstruction of the survey scheme for the outer wall of Amphitheatre 2.

Survey and layout

By Julian Baum and Tony Wilmott

The second amphitheatre was built symmetrically around its predecessor. The main determining factor in its layout was the desire to retain the existing arena while increasing the size, sophistication and seating capacity of the building. The oval of the new outer wall is concentric around the outer wall of Amphitheatre 1, and appears to have been created by using the same centres as were used in the initial layout of the first amphitheatre (p 151: Fig 210). This suggests

either that the surveyors could work back from the form of Amphitheatre 1 to work out the original survey method, or that this method and the necessary calculations had been recorded in an archive, as the plan of the Elliptical Building within the fortress must have been (Mason 2000a, 123).

In order to survey the layout of the new building the outer wall of Amphitheatre 1 must have been thoroughly dismantled. It has already been remarked that the maximum surviving height of the walls of the first building was five courses (Figs 50, 51, 57, 59, 131, 195). By the time



Fig 211 Reconstruction showing an aerial view of the second amphitheatre in relation to the Souter's Lane ravine and the legionary fortress.



Fig 212 Reconstructed view of the west side of the amphitheatre with relation to the fortress and the Souter's Lane ravine, here shown vegetated. The *vomitorium* entrance replaces a major western entrance, which would be impossible due to the terrain.



Fig 213 Stone-built amphitheatre depicted on Trajan's Column. The building seems to have a three arched main entrance without an opposite counterpart, and shows stairs running down from the vomitoria.

Amphitheatre 2 was built the external ground level around its predecessor had been raised artificially to the level of the fifth course of the outer wall, at least in Area A (Fig 125). By comparison, activities on the Elliptical Building site between the laying of the unused Flavian foundation and the actual construction of the building in the Severan period had raised the ground level by a metre (Mason 2000a, 111). It seems reasonable to assume, therefore, that the original outer wall was demolished to the level of what had become the contemporary ground surface by the time the second amphitheatre was built, leaving five buried courses, possibly uniformly, around the circuit. By superimposing the plan of Amphitheatre 2 on a digital terrain model of the area it becomes clear that there was also a topographical determinant to the possible extent of the building, namely the natural cleft or defile of Souters Lane to the west of the site. The enlarged building could extend only as far as the edge of this feature (Figs 152, 210), and the surveyors appear to have sited the western side of the building as close as they dared to the ravine.

Ever since the amphitheatre was discovered it has been assumed that there was a major entrance opening into the arena on the western side of the building to mirror the entrance to the east. However the proximity of the west side of the building to the Souters Lane ravine makes it abundantly clear that access to such a major entrance would be impossible. We have therefore substituted a standard vomitorium for a principal gate in this position (Figs 152, 211, 212; interestingly, Golvin (1988, pl xii, no 2) drew the 'stone amphitheatre' with this pattern of entrances). The stone amphitheatre depicted on Trajan's column appears to depict a similar situation with a tripartite entrance on one side of the short axis and no counterpart on the other (Fig 213). A number of amphitheatres across the empire have a similar plan to that proposed for Chester 2, with major entrances on the long axis and on one end of the

short axis only. As suggested for Chester, such plans are often influenced by topographic factors (eg Windisch (*Vindonissa; Rhaetia*), Switzerland (Matter 2011)).

Architectural reconstruction

By Tony Wilmott and Julian Baum

The base data for this are the physical remains of the building. Horizontally we have its plan, the position and design of the entrances and the arrangements of the external pilaster bases. We are however fortunate to have two further elements; firstly the depth of the arena and the distinction between the arena level and that of the contemporary exterior ground level, and secondly and most crucially the survival of the two vomitorium steps in Entrance 2.

The cavea and vomitoria

The survival of the two steps presents us with a measureable third dimension. As shown above (p 179, Fig 185) the two surviving steps (treads 0.36 m deep, risers 0.20 m high) can be projected downwards at an angle of 26° across the step edges to meet the setting out line for the bottom step in Entrance 11. This measurement makes the excavated steps the sixth and seventh in a flight. The flight of steps was contained within the length of the side-walls of the vomitorium as excavated in plan. This means that the steps would form the hypotenuse of a right-angled triangle whose baseline is the length of the vomitorium side-wall at ground level. The apex of the triangle is formed by the point at which a vertical line projected from the end of the side-wall meets the steps. In order for the stair to work in practice, the vomitoria should contain an exact number of steps of the same dimensions as those excavated. From the street level marking-out line to the end of the vomitorium side-wall, twenty-five steps of the size excavated could be accommodated with the angle of the flight at 27.22°. This is so close to the 26° archaeologically measured value as to be insignificant in practical terms, and can be regarded as accurate (Fig 214). The vomitoria stairs were contained in a vaulted tunnel within the bulk of the structure (Figs 214, 215). They would have opened onto an upper gangway or praecintio dividing the ima cavea and the summa cavea, which would have been provided with a low balustrade wall.

Seating rows between the podium and the praecintio would consist of even-sized stepped rows (*gradus*). Modern stadium seats average some 400 mm in height (taken from a number of commercial suppliers' web sites). To compare Roman values, the seating *gradus* in the ima cavea at Pompeii are 300 mm high and 700 mm deep (Bomgardner 2000, 47). The *gradus* in the Colosseum are 720 mm deep (Bomgardner 2000, 17). The depth of the *gradus* is important, as each would need to be deep enough to accommodate the bottom of the spectator seated on that tier and the feet of the person sitting behind. The fixed values of the podium and the praecintio allow only one possible

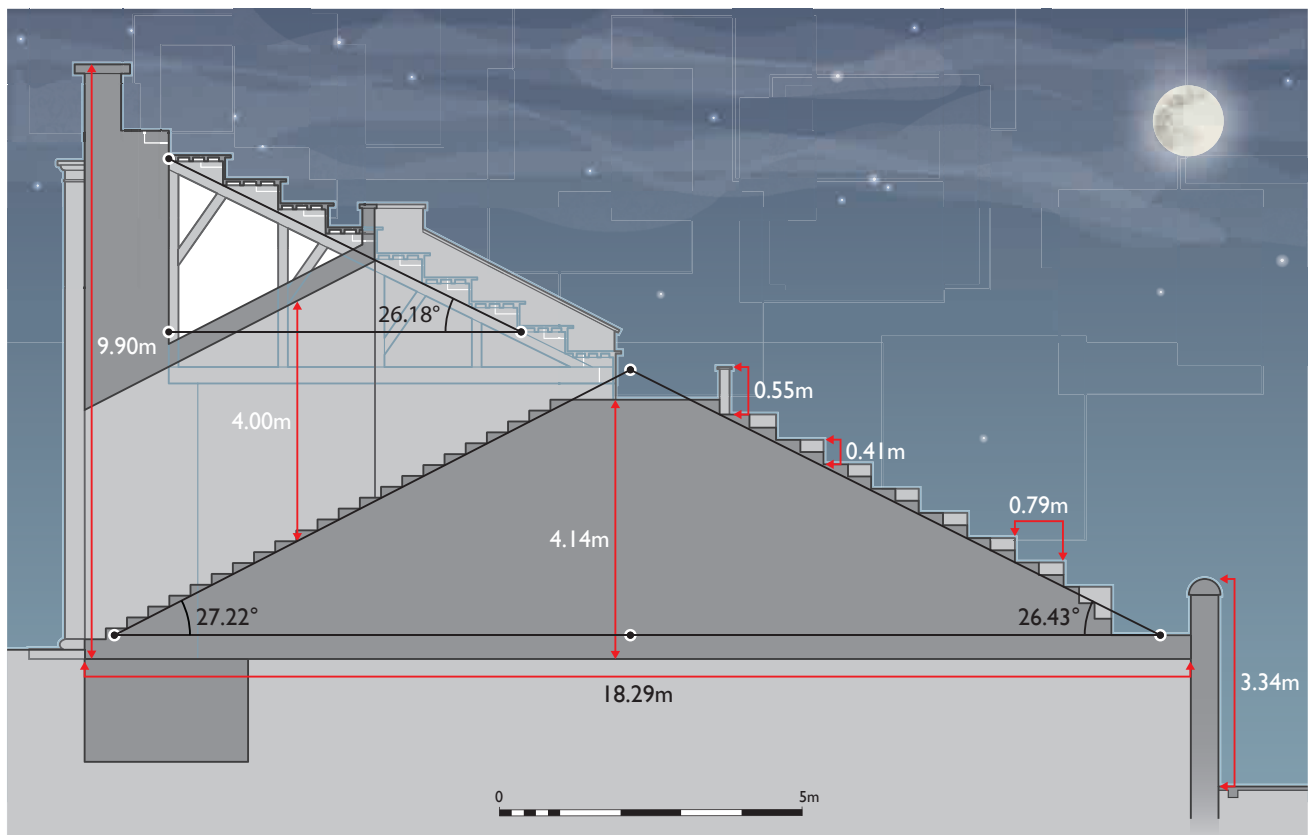
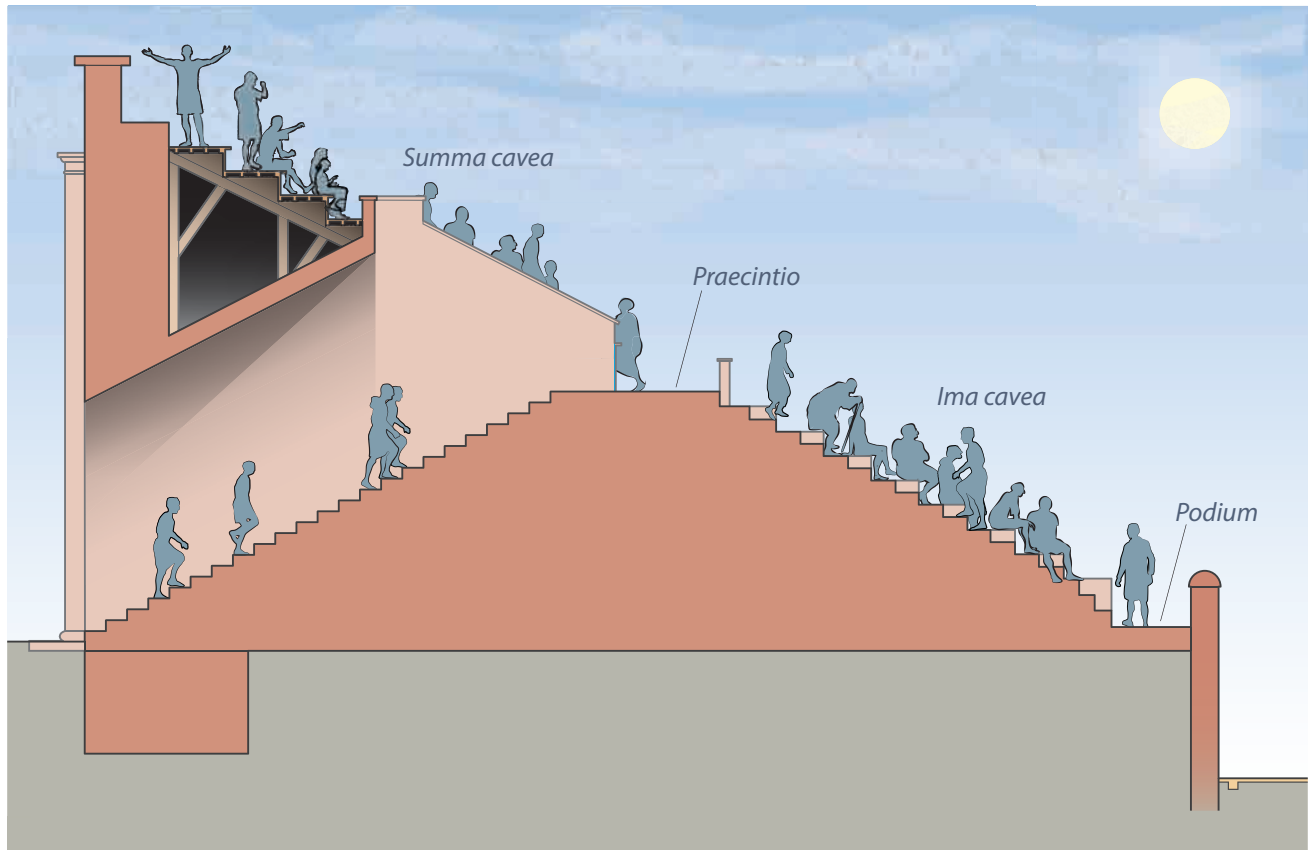


Fig 214 Reconstructed section through the *cavea* and a *vomitorium*. Note the basal isosceles triangle which seems to form the basic unit of planning and construction.



Fig 215 Reconstructed view of vomitorium Entrance 11 viewed from the outside. The arched entrance is flanked by pilaster-buttresses (the shadow is as cast by the crenelated wall and the south-east angle tower of the fortress at 19:18 hrs on June 21st).

solution (several variants were attempted, unsuccessfully); there were eight seating *gradus*, each 410 mm high and 790 mm deep. After we had built this solution into the computer model we extracted a cross-section of the *cavea*, and found that the angle of these seats from the *podium* was 26.43° . As shown in Fig 214, this angle is less than a degree less than that of the vomitorium steps. Furthermore, if the proposed angle of the seating rake is projected to the *praecintio*, it can be demonstrated that the cross-section of the *cavea* contains a near-perfect isosceles triangle. It is highly unlikely that this is coincidental, and we would now argue that the use of this triangular section was part of the calculations of the original architect.

It is significant that, in their recent reconstruction of the timber amphitheatre at *Viminacium*, Serbia, Bogdanović and Nikolić (2017, 91) quote the dimensions for similar seating used in modern stadia at an almost exactly similar 400 mm high and 800 mm deep (Neufert *et al* 2002, 489), and on this basis suggest a seating rake of 27° .

It is clear that the steps within the vomitoria were stone. Given the stable structure of the triangle it seems very likely that it was solid filled, and that the lower *cavea* seating, below *praecintio* level was also of stone. In order to create the *praecintio* gangway, and to ensure a simple transition from the vomitoria stairs onto this gangway it would have been structurally necessary to take the top from the triangle (Fig 214). To ease this transition the number of vomitoria stairs would need to be reduced to twenty-two. The *praecintio* balustrade wall would have to be low enough to allow those seated in the front row of the upper *cavea* to see over it. We have suggested 550 mm. In an earlier iteration of this reconstruction we assumed that the upper *cavea* also comprised stone seating, however it rapidly became apparent that the outer wall would not have had the strength to retain and counter the structural stresses created by great masses of infill pressing against it above

the vomitorium vaults. It has therefore been concluded that the seating above the *praecintio* must have been of timber, resting on framing accommodated by putlog holes in the outer wall and supported also on the vaulting of the entrances. This solution was adopted in the Colosseum where the very uppermost seats were timber framed in this way (*maenianum summum in ligneis*: Hopkins and Beard 2005, 129).

The seating in the *summa cavea* is a simple calculation of the number of seating *gradus* of the same size as those in the *ima cavea* that can be fitted into the space between the inner ends of the vomitorium side-walls and the outer wall. In turn this establishes the height of the outer wall. The space available provides for nine *gradus* on a similar seating rake to the *ima cavea* (26.18°) and a narrow ambulatory around the top of the *cavea*, though David Bomgardner (pers comm) has suggested that a rather steeper seating rake, and therefore a higher outer wall, might be desirable in this area of the *cavea* in order to improve the view of those seated here. We have suggested a parapet wall around the ambulatory of 1.2 m in height. This would be high enough for safety and low enough to allow the amphitheatre to be a vantage point to view the river and surrounding countryside.

In our model (Figs 216, 221), circulation within the *cavea* is provided by the *podium*, the *praecintio* and the ambulatory at the top. We have reconstructed stairs leading downwards from the vomitoria to link the two gangways, and stairs leading upwards to the ambulatory, set on each side of the vomitoria side-walls. The steps are each half the height and depth of the seating *gradus*. Similar steps running down the *cavea* from vomitoria are depicted on the image of the stone amphitheatre on Trajan's Column (Fig 213).

The highest surviving segment of the arena wall was 2.85 m measured from the base of the arena floor. Thompson (1976, 148) estimated that the height of the arena wall to the *podium* level was 2.41 m, based on the surviving height of the wall, the level of the base of the seating bank, and the angle of the stairs leading to the *podium* from the east side of Entrance 12. This is consistent with the average height of 2.63 m for arena walls derived from measurements of 45 such walls across the Empire (Golvin 1988, 316–17). The parapet to the *podium* gangway would need to be low enough to see over but high enough for safety. We suggest a height of about 930 mm including the half-round coping stones with a height of 250 mm (Fig 216). It is significant that the level of the *podium* established by Thompson is virtually identical to the contemporary ground level outside the amphitheatre, as established by excavation in Area A.

Entrance 12

The survival of much of the northern main entrance means that its reconstruction is relatively simple (Fig 217). It comprised a single broad funnel-shaped passage leading down into the arena at a gradient of approximately 1:8.



Fig 216 Reconstructed view of the northern *cavea* viewed from the principal east gate (Entrance 3).



Fig 217 Reconstructed view of the main north entrance (Entrance 12) viewed from the arena. The *Nemeseum* door is to the right of the entrance.

Where the passage ran under the *summa cavea* it would have been covered by a barrel vault mirroring both the slope and the gradual narrowing of the passage, while the inner portion of the passage would be open (Fig 217). The most logical and elegant point for the barrel vault to end would be on the line of the low balustrade defining

the *praecintio* (evidence from Entrance 3 confirms this, below). From the arena end of the passage, by the arena wall, stairs led from the passage to the *podium*. In line with the arena wall at the end of the passage was a sill for a two-leaf timber gate. When closed this double gate would seal off the passage from the arena, but when open, each leaf

was exactly the right size to block the *podium* stairs. This arrangement was probably to allow animals to be driven into the arena, while ensuring the safety of the spectators (Fig 218). Similar uses of opening doors to block other



Fig 218 The arena end of the passage of Entrance 12 showing the podium stairs and the timber gate which opened to block them.

access, varying access according to need is found, *inter alia*, at Augst (Hufschmid 2007, abb 62, 63)

Entrance 3

In reconstructing the main east entrance we were initially influenced by Thompson's idea that a *tribunal* existed above the passage into the arena (Thompson 1976, 176–7; Sunter 1976, fig 50), and our early reconstruction for the bronze model retained this concept (Baum 2010, Fig 224f). This idea relied largely upon the interpretation as original of the inserted side-walls and stairs at the inner end of the passage. It is now thought that these features were part of a post-Roman modification of the entrance (Matthews 2004, 12; p 172, and see Volume 2 of this report). The area between these walls was filled with debris including two column drums and some moulding fragments that Thompson considered to be part of the ornamentation of a *tribunal*. When the later side-walls are removed from the Roman plan it becomes apparent that the passage into the arena would have been much too broad for a *tribunal* to have been supported above it. Where such *tribunalia* are attested on the short axes of amphitheatres, as for example at Arles (*Arelate*; *Gallia Narbonensis*), France (Bomgardner 2000, 111), Fréjus (*Forum Julii*; *Gallia Narbonensis*), France (Pasqualini *et al* 2010, 124–7), *Salona* (*Dalmatia*), Croatia (Dyggve 1933) and Caerleon (Wheeler and Wheeler 1928, 35) any entrance into the arena is very narrow or, in the case of *Vindonissa* (Matter 2011) and Tarragona (Taller Escola D'Arqueologia 1990, 155), non-

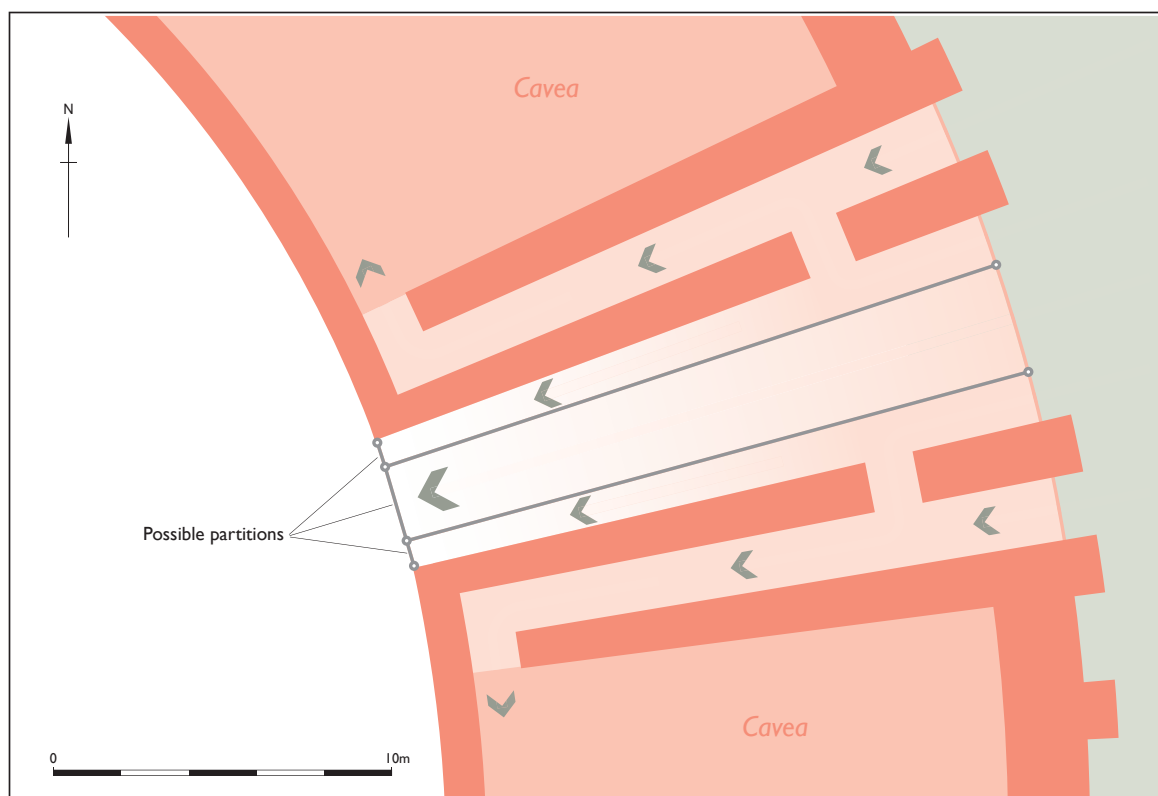


Fig 219 Reconstructed plan of Entrance 3 reconstructing the access routes into the arena and the *cavea*.



Fig 220 Exterior view of Entrance 3 showing the doors connecting the main and side passages.

existent. The idea of a *tribunal* over the east entrance at Chester thus must be rejected.

The entrance comprised three passages (Fig 219). The central passage led into the arena. It took the form of a broad, funnel-shaped passage, vaulted in the same way as Entrance 12. At its outer end it was flanked by two doors which opened into the flanking side passages. The floor of the passage would need to be level until these doors were passed. Beyond the doors the gradient of the passage would be slightly steeper than in Entrance 12, at 1:6. At the arena end the entrance was equipped with a wooden gate as attested by the original stone sill that was reused in the later modification. The evidence of the differential paving in the arena passage (above p 171) suggests that the passage was divided, so in Figs 219 and 220 we have reconstructed timber partitions flanking Thompson's (1976, fig 18; Fig 170) paved surface. Such partitions would have the potential to separate people from animals entering the arena, and are attested in London (Bateman *et al* 2008, 106, fig 107), and in the form of sockets for removable posts, at Pompeii (personal observation).

The side passages clearly did not open into the arena, as there are no signs of former apertures in the arena wall. It has been shown above (p 200) that the *podium* was level with the exterior ground surface (Fig 214) and it thus makes sense to see the two side passages as direct and level access to the *podium* (Fig 221). These were the only places where the seating could be accessed without the need to climb. These were additional *vomitoria* for access to the *podium* alone, and thus to the privileged 'ring-side' seating on the short axis from which the best views of the spectacles



Fig 221 Entrance 3 viewed from the arena, showing the level side passages leading to the *podium* and the central passage into the arena.

could be obtained (Bomgardner 2000, 12). Even without a *tribunal* it is still possible to see this as the main entrance for the most important spectators, who could see and be seen from all parts of the building (Figs 216, 221).

Like Entrance 12 the central passage would have been open inside the line of the parapet wall of the *summa cavea*. As shown above, the position of the *praecintio* is dictated by the angle of the steps and the length of the side-walls of the *vomitoria*. The calculated linear distance between the *praecintio* parapet wall and the arena wall is 7.92 m. This is almost exactly the length of the additional side-walls placed in the entrance passage in the post-Roman period (Matthews 2004, 12), which were thus placed in the open area, terminating where the covered vault began (see Volume 2 of this report).

Similar tripartite entrances with central access to the arena and side passages leading directly to the *podium* are found at the end of the long axes at the Amphitheater-Sichelengraben, Augst (Hufschmid 2009, 84–96, Abb 141–145), in the military amphitheatre at *Carnuntum* (Marr and Rörling 2016, abb 17b), at Trier (*Augusta Treverorum; Gallia Belgica*), Germany (Kuhnen, 2009), and at Avenches. In the latter case Bridel (2004, 213) reconstructs a *tribunal* at a high level in the *cavea*, above the entrance passage. At *Vindonissa* there was a single major entrance on the short axis, and here the side passages led to the *podium* while the central passage opened into a large *tribunal*. Access to the arena at this site was only by way of entrances on the ends of the long axis (Matter 2011, 2016). The stone-built amphitheatre featured on Trajan's column also appears to have a three-portal short-axis entrance which is not mirrored on the opposite side (Fig 213).

As well as the obvious topographical factor, the location of this most impressive of entrances on the east side, with its three-arched façade, reminiscent perhaps of a Roman triumphal arch, and possibly more elaborately ornamented than shown in Fig 220 (it might at least have had an inscription over the central arch), may also be due to the fact that it faced the direction from which road travellers from the rest of the province would approach *Deva*. This is preceded elsewhere. The (much larger) amphitheatre at Trier had a three storey façade on the south side, ornamented with blind arcades. This later became the southern entrance to the city when the city walls were built (Cüppers 1993, 12). At the Amphitheater-Sichelengraben, Augst, the western façade: 'evoked the architecture of Roman city gates and monumental arches', such that 'travellers reaching the city on the western main road were able to see the monumental façade of the amphitheatre ... from far away ...so these elements served as an indicator for the near presence of the city' (Hufschmid 2009, 114). A similar situation can be seen at Avenches (Bridel 2004).

Outer wall, façade and decoration

The height of the outer wall is a product of the geometry of the interior of the building, as shown above. The interior dimensions dictate that the height of the outer wall from ground level to the cornice at upper ambulatory level is

7.994 m. This measurement converts to a near-exact value of 27.006 *pM*.

The pilasters at entrances have deep foundations and can be considered to have functioned as buttresses (p 189). The three intermediate pilasters between each pair of entrances however are not deeply founded and perform a decorative role. The spacing of the pilasters presents an attractive rhythm which would not be the case if there were either more or fewer, and the side passages of Entrance 3 sit harmoniously within the architectural effect (Fig 223). An earlier attempt at a reconstruction of the amphitheatre (Garner and Wilmott 2007; Wilmott *et al* 2006, Wilmott and Garner 2009; Baum 2010; Fig 224e, f) suggested a much higher wall and an elaborate façade, though this was undertaken before the importance of the surviving stair in calculating the height of the building was realised, and was driven by perceptions of the nature of the façade. Even before the excavation began in 2004 a reconstruction painting by Peter Dunn had suggested a façade featuring two stories of blind arcading of the style found at Arles and Nîmes (*Nemausus; Gallia Narbonensis*) France (Fig 224d; reproduced in Wilmott 2004b). Every other previous reconstruction, from the very earliest (Figs 14, 224a) has shown plain pilasters (Sunter 1976, fig 52), and we have returned to this interpretation, as the outer wall was not high enough for further elaboration. The paucity of finds of architectural stonework on the site suggests that any ornamentation was very plain, and any decorated fragments not so ornate as to preclude easy reuse (half-round pilasters, Corinthian capitals for instance), so we have reconstructed the very simplest capitals and bases possible.

The cornice fragments found in the area of Entrance 12 are too small to have been a decorative element on the whole façade, and it is suggested that they formed part of a simple ornamentation of the main entrances and the entrance passages (Fig 217).

Finally we include a reconstructed view of the exterior of the building and the fortress in context viewed from the river (Fig 225).

Seating capacity

By Tony Wilmott and Julian Baum

The seating capacities of amphitheatres are often quoted, sometimes on poor evidence, and estimations can be a difficult issue. Our reconstructed interpretation allows for 3,166.87 m (10,390 ft) of seating space; that is 3.16687 km, or 1.97 statute miles! Capacity calculations can only give the *maximum* number of people that *could* be accommodated in the auditorium at any one time, and have tended to assume that everybody is squashed in shoulder-to-shoulder. Whether these maxima were often or indeed ever achieved is a wholly different (and wholly insoluble) issue, and it is also impossible to know the mix of genders, ages



Fig 222 The arena and Entrance 3 viewed from the west. This view assumes that the south side of the *cavea* is symmetrical with the north.



Fig 223 The amphitheatre and legionary fortress viewed from the east.



Fig 224 Previous reconstructions of the Chester amphitheatre: (a) The first attempt, by Lawson, 1932. (b) Model in the Grosvenor Museum. (c) Artist unknown, 1960s, (d) By Peter Dunn, 2004. (e) Based on the amphitheatre project, by Julian Baum, 2008. (f) Bronze model installed on site, 2010.

and sizes in any given audience. Any figure is therefore a *potential* capacity only.

In order to estimate potential capacity, the first question is the amount of space that might be taken up by each person. In such an estimate modern seating allowances are a good starting point (although the concept of an allowance is not, of course, relevant to the Roman amphitheatre). These statistics are readily accessible on-line. In 2012 a survey of economy seating in 32 airlines gave a range between 410 mm (Ryanair) and 470 mm (Air Canada) (*Business Traveller*, 2012). On Eurostar (2017), standard class seats are 470 mm wide, while

on Chinese trains, hard class seat widths are 420 mm, with 470 mm in soft class (*Travel China Guide* 2016). Modern cinema seats are much wider, at 550–650 mm, but here comfort is a major concern (Independent Cinema Office 2016). Published statistics for the shoulder widths of modern US adults used for ergonomic design give average figures of 455 mm for males and 398 mm for females in the 50th percentile and 498 mm for males and 447 mm for females in the 95th percentile of the population surveyed (ErgoTMC 2016). Bomgardner (2000, 47) shows that the front parts of the seats in the *ima cavea* of the amphitheatre at Pompeii



Fig 225 The amphitheatre and fortress viewed from the banks of the river Dee (lighting as at midday, June 21st).

designed ‘for the bottoms of the spectators’ were 380 mm wide, and his seating estimates are based on a seat width of 400 mm.

On consideration of these statistics, we have chosen (possibly generously) to estimate capacity on the basis of a shoulder width of 450 mm, representing an approximate average for males in the modern ergonomic statistics, and for seat width provision in modern trains and aeroplanes. This gives a potential capacity of 7,037 people. Using the 400 mm unit preferred by Bomgardner for Roman amphitheatres the potential capacity would increase to 7,917 people. Arguably, the rear of the parapet ambulatory allows standing room, to a length of 279.08 m. Shoulder-to-shoulder, using the male 450 mm width, this provides space for a further 620 people. As a ‘quoteable estimate’ it therefore seems reasonable to say that the second amphitheatre of Roman Chester could potentially accommodate in the order of 7,500–8,000 spectators.

The arena wall coping stone inscriptions

Two of the coping stones found in the arena fill in 1966 were inscribed. Both came from a point very close to the arena wall from which they had fallen, just north of the east entrance (Thompson 1976, 186). The most complete inscription (RIB III, 3157) reads ‘SERANO LOCVS’ (Fig 204). The initial interpretation by Wright (1976, 186) of the SERANO inscription was that it indicated ‘Seranus’ place’ in the amphitheatre seating. This has recently been questioned by the editors of RIB (Tomlin *et al* 2009, 159), who remark that ‘this sense is unlikely here, both because RIB III, 3157 is not a bench but a coping stone, and because it lacks the formality of the texts [Wright] cites’. However,

in the volumes of *Epigrafia Anfiteatrale Dell’Occidente Romano* there are many examples of semi-circular coping stones bearing inscriptions of names, sometimes combined with the word *locus*, which clearly have the sense of ‘a place for...’, and many are no better in terms of their carving than the Seranus stone from Chester. This occurs at Arles, Nîmes, Trier and Lyons (*Lugdunum*), all in Gaul (Vismara and Caldelli 2000, 59, cat nos 40a.2–3; 62, cat nos 41, 43; 148, cat no 81.4; 128 cat no 79), and at Syracuse (*Syracusae*), Sicily, where coping stones have twenty-four inscriptions of this type (Buonocore 1992, 119 cat nos 85.1–24). At Oudhna (*Uthina; Africa Proconsularis*), Tunisia, the arena wall takes the form of adjoining slabs with a curved top. The arena face of the wall bears a large imperial inscription, while on the rear faces are the names of individuals in the genitive, and in thirty-two cases such names are carved into the curved tops of the slabs. In widely differing lettering styles, these are interpreted as identifying the seats of successive *duoviri* (Ben Abdullah *et al* 1998, 81; Ben Hassan and Maurin 2004a, nos 118, 121–2, 124–5, 128–38, 140–54, 157, 160–63). Similarly at Tebessa (*Theveste; Africa Proconsularis*), Algeria, a square top to the arena wall parapet was inscribed with thirty-seven individual names (Lequément nd, 106–36, nos 15–52).

The second inscribed coping stone, found near Seranus (RIB III, 3154) reads ‘...ET FEC’ (and built it). Again the editors of RIB (Tomlin *et al* 2009, 160) see this as a possible quarry inscription with the rest of the lettering erased when it was formed into a coping. However another interpretation is possible. The coping stones of the arena wall of the amphitheatre of Pompeii bear inscriptions commemorating the benefactors who paid for the construction of parts of the seating (*CIL* X, 853–857d; Cooley and Cooley 2004, 46–7),

thus T Atillius Celer, instead of games and lights funded the building of a *cuneus*, or wedge of seating (*cun[eu]m/[f]aciendum*) (CIL X 854). Arena wall inscriptions tend to be found at the ends of the short axes of amphitheatres. Both the Pompeiian benefactors and also the extraordinary text recording the generosity of the *duumvir*, C Iunius Priscus at Arles occupy this position. The latter is repeated on the face of the arena wall at each side of the amphitheatre, on the short axis (Vismara and Caldelli 2000, 34–6, cat no 7).

These parallels suggest that the inscribed copings from Chester can be better interpreted in terms of an empire-wide pattern whereby the seats of notable individuals and their benefactions were recorded prominently on the arena wall and its parapet and copings. It is particularly significant that the inscribed copings were found near the east entrance, as this reinforces the interpretation of this entrance as providing direct access to the *podium* for the more important spectators.

Nemeseum

The interpretation of the *Nemeseum* as a feature of Amphitheatre 1b solves an issue, in that the lettering on the altar (Fig 148) is of an early form (pers comm D Robinson), and would fit better into a pre-Amphitheatre 2 milieu. The altar thus probably remained *in situ* through the rebuilding. The retention of the *Nemeseum* in Amphitheatre 2, despite its awkward angle and the probable need to rob the face of the side-wall to install *podium* steps, may simply be down to a desire not to interfere with what was a sacred space (for discussion of the cult of Nemesis in the amphitheatre and structural parallels see p 157; for the later history of the *Nemeseum* see Volume 2 of this report).

Arena and spectacles

Evidence for arena ‘furniture’ like the tethering blocks at Chester are rare finds, although some similar facilities for tethering have been found in other buildings.

In Britain in the centre of the Period II arena of the theatre-amphitheatre at Verulamium was a

‘cross-shaped cutting, with arms approximately 10 ft. 6 in. and 9 ft. 6 in. long, 1 ft. 6 in. broad, and 6 in. deep. At the point of intersection was a slightly deeper, round depression, in which had obviously stood an upright, supported by the two bed-plates, which were themselves pegged down.’ (Kenyon 1935, 218).

Kenyon herself suggested that this might have been a ‘post to which baited beasts could be chained’. In Period IV of this structure in the middle of the orchestra was found

‘a stone with an iron pin set in lead in its centre. It seems possible that this served the same purpose as the cross-pieces and upright of period II’ (Kenyon 1935, 247).

In the theatre at *Clunia (Hispania Tarraconensis)*, Spain, the orchestra was converted to use as an arena. In the

centre of the arena was a stone block with a circular groove cut into the top to house a metal ring, held in place by a bronze loop. The excavators suggest that this was to control wild animals. The block was inscribed with consular dates showing the renovation to have taken place in AD 169 (Tuset *et al* 2009; Gomez-Pantoja 2009, 34 cat no 47). In the centre of the arena of the amphitheatre at *Viminacum*, was a stone block of similar dimensions to that at Chester, with a square hole in the centre (Fig 226c), though no metal part survived in this socket (I Bogdanovic, pers comm). As this volume was going to press I was informed of a similar feature in the centre of the arena at Pompeii (pers comm D Blumberg and D Mantice).

Such arena furniture is rarely depicted in the iconography of the amphitheatre. The most compelling example, however, is from a mosaic at the villa of Bignor, West Sussex (Fig 226b). Here two gladiators, a *retiarius* and a *secutor*, are seen fighting across a stone block which has an iron ring in the centre. Neither fighter is actually fastened to the stone, and it is likely that it was intended to represent a piece of arena furniture used for wild beast spectacles. It was clearly considered important, as it appears not once but twice in this mosaic (Wilmott 2008, 162, 172–3). It may well be a reference to *venatores* given that the female figure in the apse of this mosaic has been identified with Diana-Nemesis (Foucher 1994). Finally it is helpful to cite a more recent local parallel. At Audlem, Cheshire near the Buttermarket, there remains a large granite stone, with an iron fitting leaded into its surface. This exact parallel to the stone in the Chester amphitheatre was used in historic times for bear-baiting (Devine and Clark 2003; Fig 226d).

Dating

The problem of the date of the second amphitheatre remains. The bulk of the artefactual evidence indicates that the building is at least post-Hadrianic. This is, to say the least, sparse, and we are therefore thrown back upon reasoning from the history of Roman Chester as a whole. It has been noted above that the debris accumulation outside the first amphitheatre was some 1 m deep, and that the walls of the first building appear to have been demolished to the contemporary ground level prior to the construction of Amphitheatre 2. This is comparable with the depth of debris separating the Flavian foundations of the Elliptical Building from the floor level of the structure as built *de novo* in the Severan period (p 198; Mason 2000a, 111).

The dating evidence for the first amphitheatre demonstrates a Flavian-Trajanic date for the construction of both phases, with a Trajanic date *c* AD 100 for the creation of Amphitheatre 1b. For most of the two middle quarters of the second century there is ample evidence that the majority of the legionary garrison was absent, undertaking works on the northern frontier (p 6). It is only after Severus’ campaigns into Scotland that the fortress at Chester was fully recommissioned. Mason (2012,



Fig 226 Arena furniture: (a) The tethering stone from Chester. (b) Gladiator mosaic from Bignor villa, Sussex (by kind permission of the Tupper family). (c) Stone from the amphitheatre at *Viminacium*, Serbia (by permission of Ivan Bogdanovic). (d) Bear baiting stone at Audlem, Cheshire.

175) states that the fortress was equipped with ‘a full complement of buildings for the first time in its history’ at this time, including the completion of the Elliptical Building. The paucity of evidence for the dating of the second amphitheatre means that for the present it seems reasonable tentatively to conclude that the amphitheatre was built as part of the Severan works. This would have been contemporary with the date of the final refurbishment of the amphitheatre at Caerleon, and a major refurbishment of the legionary fortress there as well (Wheeler and Wheeler

1928, 151–4). The working life of the second amphitheatre appears to have been short. The dark soil found by both Newstead and Thompson across the arena floor, and the patchy stone flooring laid above it suggest abandonment and a subsequent change of use. There is no reason to doubt that the 3rd-century coins contained within the dark soil (p 195) provide a terminal date for the use of the amphitheatre in the later 3rd century, suggesting a working lifetime for the second amphitheatre of perhaps eighty years.

PART 4

LIFE IN EARLY ROMAN CHESTER: ARTEFACTUAL AND ENVIRONMENTAL STUDIES

SYNTHESIS

The site has produced a wealth of Roman finds material, and of evidence for diet and environment in Roman Chester. The major contribution that the finds make to the history of the amphitheatre itself is chronological; there is a great deal of dating evidence for the first Roman amphitheatre, though disappointingly little for the second. The vast majority of the finds and environmental material derives from deposits in Area A Phase 5, during the working lifetime of Amphitheatre 1a, and the material collected, apparently, from the fortress and *canabae*, to be deployed in the construction of the seating bank for Amphitheatre 1b in Area B, Phase 6. In Phase 5 some, and in Phase 7 most, of the finds must reflect activities carried out around the amphitheatre during its working lifetime.

Although much of this material is irrelevant to the amphitheatre, except for the fact it was imported as construction material, these assemblages are important, as they are extraordinarily well dated (pp 86–88; 128–29). In both Area A, Phase 5 and Area B Phase 6, although the local pottery wares can only be broadly dated to a range from the mid-1st to the early-2nd century, the latest vessels in the large South Gaulish samian ware assemblage were produced in the later Domitianic to early Trajanic period. There are no products of definite Trajanic or later date. Added to this is the coin assemblage. Three Domitianic coins, all coincidentally dated to AD 85 were recovered from scattered contexts in Area A Phase 5, and the numismatic *terminus post quem* for the construction of the seating in Amphitheatre 1b in Phase 6 is AD 92–4 (CO25). This completely agrees with the samian evidence from the seating bank. The inescapable conclusion is that these deposits were laid down *c* AD 100. It is in this date that the importance of the Phase 5 and 6 assemblages lies. Very unusually, we have here a diverse group of material that can attest to the range of resources available, and activities practised in the first three decades (*c* AD 70–100) of the existence of Roman Chester.

It is possible that the seating bank dumps in Area B Phase 6 were an aspect of clearance or alterations within the fortress and *canabae*, occasioned by the change of legionary garrison and the arrival of Legion XX *Valeria Victrix* *c* AD 86–87 (p 4). The dating evidence for Amphitheatres 1a and 1b certainly agree with this idea (p 158). Although the dumps contain a large quantity of building material, there are none of the relatively common and very characteristic legionary stamps or antefixes of the Twentieth legion in the stratified deposits. Such objects do appear residually in later disturbed deposits, but within the stratified sequence the earliest appearance is in Phase 7, the phase of use of Amphitheatre 1b (BM Cat Nos 3 and 4, Table 76). The Phase 6 seating bank dumps might thus potentially be seen as a minor version of the phenomenon of site clearance seen in abandoned military sites such as Inchtuthil and Newstead (Bishop 1986). Perhaps a better parallel is the famous *Schutthügel* at Vindonissa, the great rubbish tip which seems to have been augmented whenever the legion in garrison changed (Ettlinger and Gonzenbach 1951–2; 1955–6; Ettlinger and Simonett 1952; van der Waals 1954; Bishop and Coulston 1993, 65). The idea of clearance is backed up by the quantity of building material represented in the dumps. A total of 4,200 fragments (35.47 kg) of ceramic building material (CBM) was recovered from the small volume of seating bank excavated. This comprised predominantly roofing tile, but all types listed in Table 76 were represented except for the solid voussoirs (*cuneati*) and antefixes. It is probable that a proportion of this material derived from the fortress baths, notably the herringbone-floor brick and hypocaust tiles. The pieces of rare circular, domed window glass from Phase 5 in Area A are also likely to have derived from an *oculus* at the fortress *thermae*. The fact that the baths seem to have been completed in AD 79, not long before the arrival of Legion XX (Mason 2005, 8), suggests that these materials may have been builders' debris from the construction of this facility. Building materials found residually in later robber trenches and other disturbed contexts in Area B may be redeposited from the seating

banks. These deposits also yielded further examples of domed windows. Although the plano-convex glass counters (Func Cat nos 140–89) are most likely to have been used for gaming, Cool (2016) has pointed to the use of such objects in interior decoration. The dump deposits also contained 240 fragments (2,090 g) of cement mix, much of which was *opus signinum* (p 360). Again this is likely to have been debris from bath-house construction. Painted plaster was also found in these dumps (71 fragments; 443 g; p 374), and several pieces bear evidence of redecoration, with two layers of fine plaster separated by a layer of mortar. The implication of this material may be that structures with painted walls were available for demolition, and the evidence of repainting shows that wall painting began early in Chester's history. Daub, some of which had traces of white lime-wash on the surface, also appears to attest to some demolition work, although it is unlikely that these fragments originated from buildings. The deposits around the outside of Amphitheatre 1a in Area A, Phase 5 contained a similar mixture of building material, but here it was noticeably more fragmented. This may be because it was spread out and was prone to being weathered and trampled.

Phase 5 and 6 contexts were particularly rich in evidence for diet. An unexpected aspect of this was the sheer quantity of fish bone. These deposits have provided the largest single assemblage of fish bone yet recovered from Roman Britain (p 414). A wide range of marine fish were consumed, the species mix indicating fishing activity locally in the River Dee, the Dee estuary, and some inshore fishing in Liverpool Bay. Most of the fish consumed in the first century were members of various flatfish species which accounted for 70 % of the identified bones. These were probably cooked whole and eaten on the bone. Eel was the second most common, followed by a variety of different fish in small quantities. Twenty-seven taxa were represented. One might suspect that the fishery activity was a continuation of established pre-Roman practice, were it not for the fact that there seems to have been a cultural aversion to the consumption of fish in the pre-Roman Iron Age (Dobney and Eryvynck 2007). It seems, therefore that the exploitation of marine resources was an early priority which became well established early in the life of Roman Chester. Whether this had anything to do with the fact that the first garrison, Legion *II Adiutrix* had been very recently formed (*c* AD 70) from marines of the Ravenna fleet (Holder 1982, 104) and might have encouraged such a development can only be speculation. The taste for fish and fish products was also catered for by the importation of Spanish mackerel, probably in the form of a preserved salted foodstuff known as *salsamenta* (p 428). A *dipinto* on an amphora neck found in Chester in 1970 describes the contents as 'flavoured sauce of fish tails, matured for the larder...' (RIB II.6, 2492.11). A further *dipinto* found in 1976 contained '[merchandise] of the financial department of the imperial estates of the province of Baetica' (RIB

II.6, 2492.44). Although Baetica was a frequent source of fish sauces, the *dipinto* does not specify product. These two *dipinti* seem to have been conflated by Jaques *et al* (2004, 20; 2008, 352) and Alcock (2001). Despite this, RIB II.6, 2492.11 is evidence that sauce made from fish tails was reaching Chester in Spanish amphorae in the third century, and the amphitheatre evidence demonstrates that this trade started at the beginning of the life of the fortress settlement. A large quantity of oyster shell recovered from these deposits show another aspect of marine diet.

Evidence for vegetable foods is very scarce, being limited to seeds of fig and blackberry, which may have derived from human sewage (p 378).

Mammal bones were also plentiful, mostly of the three principal domesticated species – cattle, sheep and pig. In the dumped deposits of Phase 6 in Area B, pigs represented 40 % of the assemblage with cattle at 38 %. This is highly unusual as elsewhere in Chester, and in Roman Britain generally, cattle would form the majority. In Area A deposits this is the case, and it may be that the over-representation of pigs in the Area B dumps is due to some aspect of deposition and re-deposition that we cannot now trace, possibly suggesting an original source in an area of specialised pig butchery. The cattle, sheep and pig bones are all mixtures of waste from consumption and primary butchery (p 410). Most cattle were killed at three to four years of age. The presence of neonatal sheep suggests that sheep breeding was occurring in the vicinity of Chester (p 394), though there is no evidence to suggest the same for cattle (p 387). Sheep tended to be slaughtered young, and pigs at a maximum age of two years. Heavy chopping appears to have been the most commonly employed butchery technique. It is clear that diet was supplemented, on a very small scale, by the consumption of wild game such as red and roe deer venison, hare and woodcock. It is probable that these remains came from high-status tables.

The pattern of deposition of chicken (domestic fowl) bones is significant. The quantity increases through time, peaking in the deposits of Phase 7 in Area A (p 410). These deposits are those most definitely associated with activity around the amphitheatre rather than being imported waste, and include evidence for stalls from which it is suggested snack food and souvenirs were sold (p 159). Few sites in the country have as high a percentage of chicken as from these deposits, with only the legionary bath-house at Caerleon having a similar pattern (p 410). The fact that both of these are legionary establishments, and both places of entertainment and resort, rather than domestic and/or 'military' in status may be significant and the high amounts of chicken indicates it may have been the snack of choice (p 160). Allen (2011) has argued that the consumption of chicken is intimately related to the notion of what it is to be a city-dweller and soldier at the time and that this may have been a symbol of 'imperial living'. Imperial living or the pretence thereof, it could be argued, is also strongly associated with bath-houses and amphitheatres linking

attendance at these venues and chicken consumption. Evidence for the consumption of snack food at bath-houses can be found in Seneca's complaints about hawkers selling food around the baths at Baia (*Ep.* 56. 1–4). At the Central Baths in Herculaneum a graffito records one Nicanor, an egg seller (CIL iv.10603), while in the Suburban Baths a price list for a range of snack foods was painted on a wall, including nuts, drinks, hog's fat (?pork scratchings, Cooley and Cooley 2013, 116), bread, cutlets and sausage (CIL iv.10674; for discussion see Fagan 2005, 33).

Linked to the topic of diet are the fragments of portable ovens found in large numbers on the site, and discussed extensively below by Alison Heke (pp 345–53). Despite the fact that these were found in contexts of different origins (p 159) it remains possible that they were used to prepare snack food consumed at the amphitheatre. Fragments of daub found in the backfill of the Phase 5 cess pits in Area A may derive from ovens which were in use for this purpose during the use of Amphitheatre 1a. Given the above discussion of snack foods at bath-houses, it is perhaps relevant that the only portable oven fragment from within the legionary fortress at Chester was found immediately north of the fortress baths (Jones 2008, 169–70 and ill 5.1.5; p 353). The relatively large number of portable ovens from the amphitheatre contexts is of interest, as that this method of cooking is more associated with the Mediterranean world than the north-western provinces (Darling 2012). These objects are, perhaps, of a piece with the amphitheatre and the bath-house in the 'creation of the familiar' (Creighton 2006, 93) by the entirely peregrine legionary military community (see RIB I 475–479, 482 for origins of soldiers in Legion *II Adiutrix* in Chester, and Malone 2006 tables iii.6.2, iii.6.3, iii.7.7 for the origins of soldiers of Legion *XX Valeria Victrix*).

Given the fact that Chester was a legionary fortress, the relatively large quantity of finds of a military nature is unsurprising. Even the denominations represented by coin loss shows that those involved in this loss were of legionary status (p 220). The body armour recovered includes fragments both of mail and of *lorica segmentata*, including fittings, both of which were in use by legionaries in the first century (Bishop and Coulston 1993, 85). Also represented are weapon fragments including projectiles and sword hilt fragments which occur frequently in any small group of Roman military finds. One of the intaglios (Func Cat no 56) has a military theme of a soldier and a trophy of arms which is only paralleled in Britain at the legionary fortress of Caerleon. The lead label (Func Cat no 39), which records the name of the centurion Constans, brings to 27 the number of men of this rank known from Chester. Two are known from similar lead labels (Atilius Maior, RIB II.1, 2410.6; Titiani, RIB II.1, 2410.7) and one from a bone label (Candidus Pistor, RIB II.1, 2410). From the amphitheatre itself we know Sextus Marcianus, who dedicated the Nemesis altar (RIB III, 3149; p 156), and Refidius, whose century participated in the construction of the arena wall (RIB III, 3156; p 124).

In order to compare the range of small objects with other assemblages, a number of published Flavian military assemblages have been selected. The auxiliary fort of Elginhaugh near Dalkeith, Lothian was excavated between 1986 and 1989 (Hanson 2007). The excavation of the fort and its associated annexe was very extensive, and a very large quantity of small finds were recovered (Allason Jones 2007). Elginhaugh is a purely Flavian fort, and the finds assemblage is wholly of Flavian date, thus contemporary with the Phase 5 and 6 assemblages. The auxiliary fort of Strageath in Perthshire was occupied in the Flavian and Antonine period (Frere and Wilkes 1989). Finds from Flavian contexts have been separated from later material in the published finds catalogues (Grew and Frere 1989). Although several periods of occupation are represented in the excavation of the auxiliary fort of Loughor, West Glamorgan (Marvell and Owen-John 1997), the finds from this site are overwhelmingly of Flavian-Trajanic date (Marvell and Owen-John 1997, 225; Lloyd Morgan 1997, 234). These three sites are also some of the geographically furthest flung of Flavian military sites. Table 13 compares some of these assemblages in an attempt to assess similarities and differences if any, and to attempt to distinguish between finds in the Phase 6 seating bank dumps and the Phase 5 spread in Area A. To the sites mentioned above, have been added Flavian groups from the Caerleon bath-house and the Castleford midden. These two groups are taken from Cool and Baxter (2002, table 1). The comparison of assemblages has shown that the amphitheatre contexts contain nothing unusual in the context of a Flavian military settlement, except for the portable ovens. Even specialist CBM has been found on auxiliary sites, in the shape of solid voussoirs (*cuneati*) at Elginhaugh. On all sites militaria and objects of personal adornment are the most common. In the latter category beads are the most common object, with melon beads particularly well represented (although these may have been used as horse trappings (Cool 2002, 27)). Of the 33 beads from Elginhaugh, 31 were melon beads, and at Loughor 49 out of 52 were melon beads. In the amphitheatre contexts melon beads appear early, with two examples appearing in Phase 4 contexts. In Phases 5 and 6 seven out of ten beads are melon beads. The others are of amber. The large assemblage of glass counters from the Area B Phase 6 dumps come from a single context, and may represent a single lost bag of gambling equipment. The finds assemblage at Loughor includes 62 such counters, and although Flavian Strageath only boasts three, there were 21 from the Antonine deposits. Glass vessel types, including square bottles, pillar-moulded bowls and facet-cut beakers occur at all four sites (Price, 1989; Allen 1997; Price and Worrell, 2007), though polychrome glass is absent from the other Flavian military groups.

Examination of the finds has not shown a great deal of difference between the sorts of material deposited in Area A Phase 5 and Area B Phase 6, and so it is difficult to separate what might have been deposited in Area A Phase

Table 13 Comparison of small finds by category between Phases 5, 6 and 7, and with finds in other Flavian military assemblages.

Area/Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A, Phase 5		1	3	13			2		1	2			370	1
B, Phase 6		2	8	8				56				4	435	4
A, Phase 7		1			1								82	
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Elginhaugh	1	23	10	53	3	2	12	10	2	1	9	20		
Strageath		8	4	4			4	3	2	2	17	3		
Loughor	10	33	27	93	18	4	26	69	11	11	11	21	380	
Caerleon bath c 75–110			4	92	1		1	28						
Castleford Midden, c 75–80			9	18	2			3	5	1				
1. Misc military objects		(excluding mail links)				7. Household				11. Horse gear/ transport				
2. Weapons		4. Personal ornament				8. Recreation				12. Tools				
3. Armour and armour fittings		5. Toilet objects				9. Weights and measures				13. Hobnails				
		6. Textile				10. Writing				14. Ovens				

5 as a result of the use of Amphitheatre 1a. The relatively more fragmented CBM from Area A Phase 5 has been mentioned, in addition, there is a larger quantity of small and easily lost objects in the Phase 5 deposits than the Phase 6 dumps. These include two amber beads, three coins, one

finger ring, four intaglios and a seal box (the Phase 6 dumps contained one amber bead, one finger ring, and none of the other object types). It is perhaps possible that these were casual losses by those attending the amphitheatre.

4.1 ARTEFACT STUDIES

THE ROMAN COINS

By David Shotter

Forty-three Roman coins were recovered from the 2000–2006 excavations. This report will consist of a full listing of these coins, followed by a discussion of their implications for our understanding of the development

of the amphitheatre and their relationship with all the other coins that are recorded as having been found at the amphitheatre during previous work (Newstead and Droop 1932; Newstead 1948; Thompson 1976). Many of the coins were in a poor condition when found, but most have been improved sufficiently in cleaning to yield at least basic identifications.

Coin list

Claudius

CO 1	Æ	<i>Dupondius</i>	VW		41–54
	(Legends illegible)				
	C (3059): Phase 14 Fill; SF 8217. Early medieval				
CO 2	Æ	<i>As</i> (copy)	VW	<i>RIC</i> 1 ² (Claudius), 100	<i>c</i> 50
	[TI CLAVDI[VS CAESAR AVG [P M TR P IMP]				
	Minerva S C				
	C (3068): Phase 13 Layer; SF 8265. Medieval				

Nero

CO 3	Æ	<i>Dupondius</i>	MW	<i>RIC</i> 1 ² (Nero), 522	62–8
	IMP NERO CAESAR AVG [P MAX TR P P P]				
	VICTORIA [AVGVSTI S C]				
	C (3154): Phase 10 Pit fill; SF 8711. Early medieval				
CO 4	Æ	<i>As</i>	LW	<i>RIC</i> 1 ² (Nero), 605	62–8
	IMP NERO CAESAR AVG P MAX TR P P P				
	Victory left with shield S C;				
	Tr M I-III (M45); Phase 21 Excavation backfill; SF M14. Modern				

Otho

CO 5	AR	<i>Denarius</i>	LW	<i>RIC</i> 1 ² (Otho), 20 (var)	69
	IMP OTHO CAESAR AVG TR P				
	Ceres, with two corn-ears and cornucopiae PONT MAX;				
C (3059):	Phase 14 Layer; SF 8182. Medieval/ post-medieval				
Note:	The second edition of <i>RIC</i> 1 lists only an <i>aureus</i> of this type; a <i>denarius</i> was originally listed by Mattingly (<i>BMCRE</i> (Otho), 9; <i>RIC</i> 1 ¹ (Otho), 6), although it was regarded by some as false; there seems, however, now no reason to doubt that the coin is a genuine Othonian issue (Giard 1998, 69, no 25: pers comm S Moorhead). Two other examples have been noted – from Shenley, Herts, reported to the Portable Antiquities Scheme (PAS) (pers comm, P Walton) one recovered in 2009 during excavations at Binchester (pers comm D Mason).				

Vespasian

CO 6	Æ	<i>Dupondius</i>	MW	(Corroded)	69–79
	[VESPAS[				
	Eagle on Globe S C (?)				
	A (002): Phase 15 Thompson backfill; SF 7001. 20th century				
CO 7	Æ	<i>As</i>	MW	(Corroded)	69–79
	[AR VESPASIAN[				
	Altar S C				
	A (698): Phase 7 Dumped deposit. SF 7004. 1st–2nd century				

CO 8	Æ	<i>Dupondius</i>	(Corroded)	69–79
	(Legends illegible)			
	A (506): Phase 11b Robber trench fill; SF 7012. Early medieval			
CO 9	Æ	<i>As</i>	MW (Corroded; fragmentary)	69–79
	Seated figure left (?)			
	A (181): Phase 14 Pit fill; SF 7294. Medieval			
CO 10	Æ	<i>Dupondius</i>	MW (Corroded)	69–79
	]AR VESPASIAN[			
	A (221): Phase 12 Pit fill; S 7295. Medieval			
CO 11	AR	<i>Denarius</i>	MW	70–
	IMP CAESAR VESPASIANVS AVG TR P			
	(Reverse illegible)			
	A (485): Phase 11a Robber trench fill; SF 7433. Early medieval			
CO 12	Æ	<i>As</i>	MW <i>RIC</i> 2 ² (Vespasian), 301	71
	[IMP CAES] VESPASIAN [AVG COS III			
	F[IDES] PVBLICA S C			
	B (2244): Phase 16 Layer; SF 7933 Post medieval			
CO 13	AR	<i>Denarius</i>	MW <i>RIC</i> 2 ² (Vespasian), 356	72–3
	IMP CAES VESP AVG P M COS IIII			
	Pontifical Instruments AVGVR TRI POT			
	A (772): Phase 6 Layer; SF 7992. 1st–2nd century			
CO 14				
CO 15	AR	Two <i>Denarii</i>	MW (Corroded together)	69–79
	B (2353): Phase 15 Layer; SF 8085. Post medieval			
	Note: This concretion has two <i>denarii</i> corroded together, of which one is an issue of Vespasian;]VESP[is visible on the X-ray of the obverse; the other <i>denarius</i> is completely illegible.			
CO 16	Æ	<i>Dupondius</i>	MW <i>RIC</i> 2 ² (Vespasian), 1195	72
	[IMP CAES] VESPASIAN AVG COS IIII (Globe to point of neck)			
	Victory and Shield S C			
	C (3054): Phase 15 Layer; SF 8098. Post medieval			
CO 17	Æ	<i>Dupondius</i>	MW <i>RIC</i> 2 ² (Vespasian), 1169	71
	[IMP CAE]S VESPASIAN [AVG COS III			
	Eagle on Globe S C			
	B (2405): Phase 15 Layer; SF 8118. Post medieval			
CO 18	Æ	<i>As</i>	LW Badly corroded	69–79
	(Legends illegible, except for S C on the reverse)			
	C (3075): Phase 13 Layer; SF 8293. Medieval			
CO 19	AR	<i>Denarius</i>	MW	69–79
	B (2233): Phase 15 Layer; SF 8348. Post medieval			
CO 20	Æ	<i>As</i>	MW <i>RIC</i> 2 ² (Vespasian), 287	71
	IMP CAES VESPASIAN AVG COS III			
	[AEQVITAS] AVGVSTI S C			
	B (2481): Phase 11b Robber trench fill; SF 8456. Early medieval			
CO 21	Æ	<i>As</i>	MW <i>RIC</i> 2 ² (Vespasian), 302	71
	IMP CAES VESPASIAN AVG [COS III]			
	[FORTVNAE REDVCI S C]			
	A (1086): Phase 3 Layer; SF 8709. Flavian			
CO 22	Æ	<i>As</i>	MW <i>RIC</i> 2 ² (Vespasian), 313	71
	IMP CAES VESPASIAN [AVG COS III]			
	Altar PROVID S C			
	A (1288): Phase 2 Layer; SF 9723. Flavian			
<i>Domitian</i>				
CO 23	Æ	<i>Dupondius</i>	LW <i>RIC</i> 2 ² (Domitian), 478	86
	[IMP] CAES DOMIT AVG GERM COS XII CENS PER P] P			
	FIDEI PVBLICAE S C			
	A (369): Phase 11b Robber trench fill; SF 7011. Early medieval			

CO 24	Æ	As	MW	Corroded	84–96
	[.....] CENS PER P P Moneta [.....] AVG S C A (339); Phase 12 pit fill; SF 7376. Medieval				
CO 25	Æ	Dupondius	MW	RIC 2 ² (Domitian), 753	92–4
	IMP CAES DOMIT AVG GERM COS XVI CENS PER P P FORTVNAE AVGVSTI S C A (886); Phase 6 Timber slot fill; SF 8116. Flavian				
CO 26	Æ	Dupondius	LW	RIC 2 ² (Domitian), 535	87
	IMP CAES DOMIT AVG GERM COS XIII CENS PER P P FORTVNAE AVGVSTI S C C (3068); Phase 13 Layer; SF 8264. Medieval				
CO 27	Æ	Dupondius	LW/MW	RIC 2 ² (Domitian), 535	87
	IMP CAES DOMIT AVG GERM COS XIII CENS PER P P FORTVNAE AVGVSTI S C C (3068); Phase 13 Layer; SF 8267. Medieval				
CO 28	Æ	As	VW	84–96	
	(Legends illegible) C (3029); Phase 21 fill; SF 8283. Modern				
CO 29	Æ	As	MW	RIC 2 ² (Domitian), 383	85
	IMP CAES DOMIT AVG GERM COS XI C[ENS PER P P] MONETA AVGVSTI S C A (1061); Phase 5 Layer; SF 8535. Flavian				
CO 30	Æ	As	MW	RIC 2 ² (Domitian), 390	85
	[IMP CAES] DOMIT AVG GERM C[OS XI CENS POT P P] [VIRTVTI AVG]VSTI S C A (625); Phase 5 Layer; SF 8538. Flavian				
CO 31	Æ	As	LW	RIC 2 ² (Domitian), 385	85
	IMP CAES DOMIT AVG GERM COS XI CENS POT P P SALVTI AVGVSTI S C A (1216); Phase 5 Pit fill; SF 9665. Flavian				
<i>Nerva</i>					
CO 32	Æ	As	LW	RIC 2 (Nerva), 98	97
	IMP NERVA CAES AVG TR P II COS III P P FORTVNA AVGVST S C B (2468); Phase 11a Robber trench fill; SF 8364. Early medieval				
<i>Trajan</i>					
CO 33	Æ	As	MW	RIC 2 (Trajan), 392	98–9
	IMP CAES NERVA TRAIAN AVG [GERM P M] TR POT [COS II P P] S C C (3096); Phase 10 Pit fill; SF 8476. Early medieval				
CO 34	Æ	As	MW	RIC 2 (Trajan), 434	101–2
	IMP CAES NERVA TRAIAN AVG GERM P M [TR POT] COS III P P S C C (3164); Phase 10 Pit fill; SF 8794. Early medieval				
<i>Hadrian</i>					
CO 35	Æ	As	LW	RIC 2 (Hadrian), 579	121
	IMP CAESAR TRAIANVS HADRIANVS AVG PONT MAX TR POT COS III PIE AVG S C (See also Hill 1970, no. 200) C (3029); Phase 21 fill; SF 8284. Modern				
CO 36	Æ	As	LW	RIC 2 (Hadrian), 579	121
	IMP CAESAR TRAIANVS HADRIANVS AVG				

PONT MAX TR POT COS III PIE AVG S C
(See also Hill 1970, no. 200)
C (3096); Phase 10 Pit fill; SF 8795. Early medieval

Sabina

CO 37 Æ *Dupondius* LW RIC 2 (Hadrian), 1023 128
SABINA AVGVSTA HADRIANI AVG P P
Ceres seated left S C
(See also Hill 1970, no. 362)
C (3160); Phase 10 Pit fill; SF 8712. Early medieval

Julia Sohaemias

CO 38 AR *Denarius* LW RIC 4 (Elagabalus), 241 218–22
IVLIA SOAEMIAS AVG
[VENVS] [CAE] [LESTIS]
C (3164); Phase 10 Pit fill; SF 9201. Early medieval

Divus Claudius

CO 39 Æ Radiate Copy LW RIC 5 (Claudius II), 259 270
[DIVO CLAVDIO]
Altar CONSECRATIO
A (452); Phase 12 pit fill; SF 7398. Medieval

Tetricus I

CO 40 Æ Radiate Copy LW RIC 5 (Tetricus I), 136 271–3
IMP C TETRICVS P F AVG
SPES PVBLICA
B (2432); Phase 13 Structure; SF 8791. Medieval

Constantius II

CO 41 Æ (Fragmentary) LW as LRBC I. 958 341–6
D N CONSTANTIVS P F AVG
Wreath VOT XX MVLT XXX (Mintmark broken off)
(Note: This reverse-type was issued only by eastern mints)
A (001); Phase 20 Topsoil; SF 7209. Modern

Illegible Coins

In addition to CO 15 which could not be separated from the *denarius* with which it is fused by corrosion products, and could not be X-rayed, there are also two corroded *aes*-objects which may be coins of Roman or later date. Neither could be cleaned further, and X-ray photography yielded no useful results; if they are Roman, their sizes would suggest that they are both issues of the fourth century.
(C (3084); Phase 14 Pit fill; (SFs 9102 and 9119). Medieval/ Post-medieval)

(Note: LW – Little worn; MW – Moderately worn; VW – Very worn)

Discussion

Chronology (Tables 14, 15)

Whilst the forty legible coins from the recent excavations cannot be regarded as a sample of satisfactory size, we should expect that it would produce at least an indication of valid trends. It is, therefore, striking that it has produced so few coins later than the mid-Hadrianic period. Not only are there no Antonine issues, but two periods (AD 250–280 and 330–360), which are normally heavily represented in

site-samples from north-west England, are only barely represented in the present group. By contrast, in the sample of all Roman coins recorded from Chester – in excess of 2,000 coins – these two periods account for nearly 40% of the total (Shotter 2000a, 77). This, of course, may well be due to more recent factors that are completely extraneous to coin-loss in the Roman period itself; support for this view is provided by the fact that the excavations of the 1930s and 1960s, between them, yielded nineteen coins

Table 14 Summary of the chronological distribution of identifiable coins (with comparative figures for the excavations of the 1930s and 1960s).

Issuer	2000–06 (40)		1930s (10)		1960s (26)	
	No.	%	No.		No.	
Claudius I	2	5.00	1		-	
Nero	2	5.00	-		1	
Galba	-	-	-		-	
Otho	1	2.50	-		-	
Vespasian	16	40.00	3		3	
Titus (as Caesar)	-	-	-		1	
Titus	-	-	-		-	
Domitian	9	22.50	1		-	
Nerva	1	2.50	-		-	
Trajan	2	5.00	-		-	
Hadrian}	2}					
Sabina }	1}	7.50	1		-	
Commodus	-	-	-		1 (?)	
Julia Sohaemias	1	2.50	-		-	
Severus Alexander	-	-	1		-	
Julia Mamaea	-	-	-		1	
Gallienus	-	-	-		3	
Salonina	-	-	1		-	
Divus Claudius	1	2.50	-		-	
Victorinus	-	-	-		1	
Tetricus I	1	2.50	1		5	
Unassignable Radiate						
Copies	-	-	-		8	
Carausius	-	-	-		1	
Constantine I	-	-	-		1	
Constantius II	1	2.50	1		-	

There was also a small hoard of seven radiates – Postumus (1), Victorinus (1), Divus Claudius (1), Tetricus I (2), Tetricus II (2) – which was found above the floor of the arena (Newstead and Droop 1932a, 36–7; Shotter 2000a, 165).

(Note: the information contained in the columns for the 1930s and the 1960s is derived from the following sources – Newstead and Droop 1932a, 35–7, Newstead 1948b, 99–105, Thompson 1976, 188–9 and from the Grosvenor Museum, together with a few casual reports).

from period XIII (AD 259–75), together with the seven coins of the small hoard. None of the excavations, however, have produced more than a single identifiable coin of the 4th century.

The bulk of the present group of coins are issues of the Flavian period, although we should not regard the coins of this period as having a straightforward interpretative character. There are, for example, no issues of the reign of Titus (AD 79–81); secondly, the sixteen issues of the reign of Vespasian are by no means distributed in a fashion that can be regarded as even or ‘typical’. It is universally recognised that Vespasian’s coinage was dominated by two periods of prolific issues – AD 71 (the year of the

Table 15 Total recorded coin-loss by periods (76 legible coins).

I	(– AD 41)	-	XII	(235 – 59)	-
II	(41 – 54)	3	XIII	(259 – 75)	21
III	(54 – 68)	3	XIV	(275 – 94)	1
IV	(69 – 96)	34	XV	(294 – 324)	-
V	(96 – 117)	3	XVI	(324 – 30)	-
VI	(117 – 38)	4	XVII	(330 – 46)	2
VII	(138 – 61)	-	XVIII	(346 – 64)	1
VIII	(161 – 80)	-	XIX	(364 – 78)	-
IX	(180 – 92)	1	XX	(378 – 88)	-
X	(192 – 222)	1	XXI	(388 –)	-
XI	(222 – 35)	2			

Emperor’s third consulship) and 77–78 (the year of his eighth consulship).

Although the usefulness of the present group is weakened by the fact that many of the coins of Vespasian are too damaged and/or corroded to permit either assignation to a particular issue-year or detailed assessment of the wear that they exhibited, there are amongst those that can be given a precise year of issue none of AD 77–8. Indeed, the breakdown of issue-years of the sixteen coins of Vespasian’s reign is as follows:

70–1	1
71	5
72–3	2
69–79	8

There are, therefore, no coins in the present group which were certainly issued between AD 73 and 79. The likely significance of the apparent predominance of coins of Vespasian’s early years is further highlighted by the presence in the group of two coins each of Claudius (both contemporary copies; Sutherland 1937, 3–13) and Nero, and one of Otho (Shotter 2001). Both the coin of Nero and that of Otho exhibited very little wear. It seems reasonable to suppose that the sum of these characteristics reflects the arrival in Chester of men from Legion *II Adiutrix* and the beginning of construction-work on the fortress. *II Adiutrix*, with its recent naval background, would have been a particularly suitable unit to have adjacent to the estuary of the Dee, if the assault on Brigantian territory that began under Vettius Bolanus and Petillius Cerialis (Tacitus *Life of Agricola* 17,1; Birley 1973; Shotter 2000b) consisted of an integrated advance by land and sea.

The *terminus post quem* (TPQ) for the construction of Amphitheatre 1a is provided by two early Vespasianic issues (CO 21, CO 22; p 84), and the clean nature of the construction material might suggest that construction was early, and possibly initiated by *II Adiutrix*.

The coinage of Domitian contains two issues to which particular years could not be given; there are six coins of the years, AD 85–87, of which three (CO 29, CO 30,

CO 31; p 157) provide evidence for the period of use of Amphitheatre 1a and a *TPQ* for the construction of the external stair. The single coin of AD 92–4 (CO 25; p 119) provided a clear *TPQ* for the installation of the timber seating. The presence of the coins of the late-80s probably reflects the changes that took place following the transfers of *II Adiutrix* to Europe and, as a consequence, the advance of *XX Valeria-Victrix* to replace it at Chester (Hobley 1989), and this may be the context for the creation of Amphitheatre 1b.

The coinage of the late-1st and early-2nd centuries also presents an unusual picture: the group contains a coin of Nerva and two of Trajan's early years, but none of the normally-prolific years of Trajan's fifth and sixth consulships (AD 103–117). Hadrian's coins consist of two identical issues of AD 121 and one of Sabina, which can be dated to AD 128 (Hill 1970, no. 362); none of these three Hadrianic coins exhibits more than slight wear.

The complete absence of coin-loss between AD 128 and the early-3rd century presumably to some extent, at least, reflects the preoccupation of the legion with action and duties on the northern frontier, creating a period which has been described as '*Deva* in the doldrums' (p 6; Mason 2001, 155ff). Chester as a whole, like many sites, saw a revival from the Severan period onwards, and this is the probable context for the construction of Amphitheatre 2, although this was not accompanied by a rise in coin loss, though it is likely, given the poor state of the structure that post-Roman activity has robbed us of the later evidence. It should be noted that the bulk of the Roman coins from the recent excavations appear to have been residual in post-Roman contexts – itself an indication of the degree of disturbance that the site has undergone since Roman times.

Clearly, therefore, whilst the loss of coins of the first century AD provides important evidence relating to the early years of the amphitheatre's history, recorded coin-loss later than *c.* AD 100 unfortunately bears all the signs of unreliability in the dating of the site's development beyond the 1st century. Indeed, the large proportion of coins of period XIII (65.5%, together with a small hoard)

Table 16 Coin denominations related to *As* value.

Issuer	No. Coins	Den	Sest	Dup	As	As-value	As-value Per coin
Claudius	2	-	-	1	1	3	1.50
Nero	1	-	-	1	-	2	2.00
Otho	1	1	-	-	-	16	16.00
Vespasian	16	4	-	5	7	81	5.06
Domitian	9	-	-	4	5	13	1.44
Nerva	1	-	-	-	1	1	1.00
Trajan	2	-	-	-	2	2	1.00
Hadrian	3	-	-	1	2	4	1.33
Elagabalus	1	1	-	-	-	16	16.00

that was retrieved from the excavations of the 1960s not only indicates that there was activity at the site in the later-3rd century (which may be associated with the use of the amphitheatre for other purposes than that for which it was designed or simply reflect the disuse of the building (p 195)), but also serves to remind us of the caution that needs to be exercised when attempting to interpret the record of coin-loss from Chester's amphitheatre.

Denominations

Although the present group of coins is small – and presumably 'artificially' so (see above) – the denominations involved in the coin-loss (up to period X) can provide indications of wealth, and thus of the nature of the people involved in the site; beyond period X, the changing economic climate and the consequent vagaries of the coin-system make this kind of study far less meaningful. Table 16 shows the coins by *As* value. The most significant observation that can be made about this table concerns the 'peak' that is represented by the coins of Nero, Otho, Vespasian and Domitian (AD 62–94); this, and the fact that five of the 27 coins are *denarii*, leaves little doubt that those involved in the coin-loss in the late-1st century AD were of legionary status. It is unfortunate that the small number of coins surviving from the 2nd century prevents any comparative analysis.

THE SAMIAN WARE

By Margaret Ward

Introduction

Each sherd of samian ware was catalogued by context on a Microsoft Access database, with details of form, fabric, decoration, potters' stamps, date of manufacture, condition of material (wear, repair, graffiti, re-use, burning) and sherd links between contexts. Maximum numbers of vessels were recorded, along with weights, rim- and footring-measurements. A report on graffiti and marks of ownership was provided by Roger Tomlin. Decorated vessels were selected for publication and illustration on the basis of intrinsic interest or significance to the site; they are detailed in the Catalogue and discussed here, as are the potters' stamps.

The products of the samian industry were highly standardised, and their study and publication has developed along standardised lines over the last century (Webster 1996). The standard terminology is used here, while the abbreviations SG, CG and EG denote vessels which were produced in South Gaulish, Central Gaulish and East Gaulish workshops. The numbering system employed in Hartley and Dickinson's *Names on terra sigillata* (hereafter *NoTS*) has been adopted, with Roman numerals in lower case following the potter's name; Roman numerals in upper case were used in 20th-century catalogues, denoting potters' styles (eg 'Sacer I'). Where date-ranges such as *c* AD 70–110 or *c* AD 120/125–200 are used for unstamped vessels, these should not be thought more precise than the traditional use of epochs (eg Flavian-earlier Trajanic or Hadrianic-Antonine); they are employed largely to facilitate digitisation. Dragendorff's (1895) form numbers are generally allocated to vessel forms unless otherwise stated, with 'ind' denoting indeterminate form or type. For other abbreviations, see the bibliography.

Methodology

Full details of vessel types, forms, fabrics and production-dates across phases and contexts are available in the database. Tables, line-diagrams and histograms summarise the quantities of sherds, weights, and the estimated numbers of vessels (both maximum and minimum). There have been repeated calls for more explicit explanations of diverse methodologies used in pottery reports (eg Greene 2007,

489); details are provided here. For basic methodology regarding the use of minimum numbers of vessels, under the guise of EVEs (Estimated Vessel Equivalents) see Orton and Hughes 2013, 21–22; Ward, M 2011, 75–77, 104 fn 3, Ward, M 2012a, 22, 26 fn 1). Lack of compatibility has been noted as hindering synthetic analysis of both samian assemblages and their contribution to the finds' array (Willis 2005, appendix 4.1; Cool and Baxter 2002, 377; Cool 2006, 227–28), and the EVEs system provides an objective method for calculating the minimum number of vessels represented. All rims and bases (footrings) were measured for EVEs; all are detailed in the database. At the time of writing, research has left the question unclear as to whether one assemblage from which rim and base percentages were used, can be compared directly with one using rims alone (Table 17). Theoretically, the combined use of rim and base percentages would be better, giving more data and therefore a better estimate. However, information from statisticians reveals the practical answer, without further practical tests, to be uncertain (Clive Orton, pers comm, see Ward, M 2012a, 23). It appears that unless these measurements can be applied to other Roman pottery also, one would not be comparing like with like. Furthermore, analysis of EVEs by footring measurement seems out of kilter with all other methodological approaches regarding samian ware (*cf* Table 18). EVEs based on rims alone are summarised below.

The EVEs method has been so little employed in samian reports, that comparisons are difficult (Ward, M 2011, 75–6; 2012a, 22–3). 'Maximum vessel numbers' have proven more practical for comparison of samian ware from different locations and of small groups according to specific fabrics, vessel types and forms; within samian studies, this method remains more meaningful than EVEs. This is particularly evident in abraded groups where vessel forms are identifiable, but no rims survive: such groups register 0.00 EVEs, whereas maximum vessel numbers can be estimated meaningfully. Ideally again, the two methods of quantification might be used in tandem, but this would be time-consuming and could prove confusing. During general research concerning the chronology of northern assemblages, histograms derived from the two methods proved, reassuringly, not too dissimilar (Ward, M 2011, 76, figs 2–3). Thus, the estimated 'maximum numbers of vessels' method is used here to facilitate comparisons both within this assemblage and between assemblages. All vessel numbers given below are the estimated maximum, unless otherwise stated.

Table 17 Samian ware per site phase: weights, sherds, maximum vessel nos and EVEs by rim %.

Phase	Sherds	Vessels (max nos)	EVEs (by rim)	Weight	Average sherd-weight	Sherds weighing <1 g
0	1	1	0	1 g	1 g	0
3	12	12	0.02	25 g	1.9 g	6
4	1	1	0	0.5 g	0.5 g	1
5	118	109	0.99	292 g	2.5 g	64
6	165	148	1.20	778.5 g	4.7 g	77
7	104	65	1.32	382 g	3.7 g	36
8	9	4	0.05	33.5 g	3.8 g	1
9	1	1	0	0.5 g	0.5 g	1
10	70	66	0.80	528.5 g	7.6 g	21
11a	69	68	0.97	454.5 g	6.6 g	15
11b	101	89	1.10	920 g	9.1 g	6
Post-Roman	671	625	8.80	3717 g	5.5 g	116
u/s	21	19	0.35	129.5 g	6.2 g	3
Total	1344	1208	15.60	7.263 kg	5.4 g	347

Table 18 Samian ware summarised by nos of sherds, maximum vessel nos, EVEs measured by rim or footring, and weights. Bracketed figures indicate proportions of the total according to fabric/area of production.

Fabric	Nos of sherds	Maximum vessel nos	EVEs by rim	EVEs by footring	Weight
SG	1175 (87.4%)	1044 (86.4%)	13.67 (87.6%)	15.19 (96.8%)	6182 g (85.1%)
CG	165 (12.3%)	160 (13.2%)	1.85 (11.9%)	0.49 (3.1%)	1047 g (14.4%)
EG	4 (0.3%)	4 (0.3%)	0.08 (0.5%)	0 (-)	34 g (0.5%)
Total (100%)	1344	1208	15.60	15.68	7.263 kg

Summary of quantities and environmental condition

The samian assemblage comprised 1,344 sherds, whose provenance by area of excavation is summarised in Table 19. Of these, 319 sherds were found within sieved samples with 190 scraps weighing less than 1 g (hereafter '<1 g'). In all, 347 scraps, chips or flakes weighed <1 g, most measuring <4 mm across. Such scraps comprised half, or more, of the sherds in large groups in Area A (625) and Area B (2498) and (2543). Of the total, 57% were of indeterminate type and 59% were of indeterminate form. Such scraps have been discounted from the statistical analysis. Based on a putative average of 0.5 g per fragment, the scraps have

Table 19 Provenance of samian ware sherds per area of excavation.

Area	Sherds	Vessels (max nos)	EVEs by rim %	Weight	Scraps, weighing <1g
A	666	578	9.37	3.665 kg	181
B	507	465	4.53	2.809 kg	129
C	171	165	1.70	0.79 kg	37
Total	1344	1208	15.50	7.263 kg	347

been ascribed an overall weight of 174 g. They represented 0.95 EVEs according to rim measurements and 0.01 EVEs by footrings. Whilst many scraps will have belonged to vessels of which larger sherds have survived, the reality was clearly far greater than the minimum number of vessels represented by rims (0.95 rim EVEs). As for production-dates of the vessels they represented, 38 were dated loosely within the Neronian-Flavian period and 297 in the general range *c* AD 70/80–110. Only 12 scraps were considered certainly to represent 2nd-century CG products. With the exception of an occasional stamp or diagnostic decoration, such scraps provide unreliable evidence. Any important details are noted below.

The overall total of 1,344 sherds is estimated to have represented a maximum of 1,208 vessels (15.60 EVEs by rim, 15.69 EVEs by footring) and weighed approximately 7.263 kg, giving an average sherd-weight of 5.4 g. Only one sherd weighed more than 100 g: Area B, Phase 10 (2457), Cat no 5. After deducting the 347 scraps weighing <1 g, the 997 sherds weighing >1 g represented an estimated maximum of 894 vessels, 14.65 EVEs by rim and 15.68 EVEs by footring, and weighed approximately 7.089 kg. Most of these vessels were represented by small to medium-sized sherds, with an average sherd-weight of 7.1 g.

The material was mostly in a good state of preservation, with little erosion of fabrics caused by specific environmental or climatic effects, but surface abrasion was not uncommon. Burning affected at least 8% of sherds found across all Phases (including associations with demolition deposits) and across all periods in the 1st and 2nd century. However, some differences were possibly significant: a relatively large proportion of burnt sherds (11%) was noted in Period 3, compared with 7% in post-Roman contexts.

Distribution by phase

The material is tabulated according to the Phase in which it was found in Table 17. While 27% of vessels were found in Amphitheatre Phases (4–9), the majority (70%) was found residually in post-Roman Phases (10–21). Most of the latter material is likely to represent disturbance of material from the earlier phases.

The fragmentary remains of seven vessels provide the complete or near-complete profiles of four dishes, two moulded bowls and a cup. Six were found in Area A and one in Area B; three were recovered from Amphitheatre 1 contexts (one in each of Phases 5, 6 and 7), while one was found in the robber trenches of Phase 11b, and three in later post-Roman contexts.

Composition of the assemblage

For purposes of comparison between collections of varying size, percentages of the whole collection are given. Table 17 provides the comparative proportions according to numbers of sherds, maximum vessel numbers, EVEs measured by

rim or footring, and weights. The proportions reveal EVEs by rim measurements as being close to the proportions by sherd count, while analysis based on EVEs measured by footring appears out of kilter with the rest and comparison by weights is influenced by the heaviness of the later products. According to maximum vessel numbers, 86.5% of the assemblage was produced in South Gaul, 13.2% in Central Gaul and 0.3% in East Gaul.

Over 85% of the collection comprised SG products. Most were made in the Flavian period, with a peak in losses visible in the Domitianic period. Of 1,044 SG vessels (865 excluding indeterminate types), almost all will have been produced at La Graufesenque. No products of its minor satellites were noted, although those of Espalion in the Lot Valley are known in the North-West (eg Carlisle, in the annexe ditch) and ware from Cajarc (Carrade) has been found in Chester, at Frodsham Street (Ward, M 2015, 138). At least one vessel from the amphitheatre may have been made at Banassac in the earlier-2nd century; however, this was an unstratified sherd displaying only a fragment of ovolo (Cat no 117); other fragments were of uncertain origin or were imprecisely datable (eg Cat nos 33, 114, 126; Ward, M 2015, 145, 148).

Only four vessels could possibly have been made at Montans; two originated in the Hadrianic-early Antonine period and two, whatever their origin, were 1st-century products; all were found in post-Roman phases (Cat nos 84, 85, 96, 97). First-century Montans products have scarcely been found in northern Britain and the two amphitheatre finds, if indeed Montans products, would be amongst the very few (Ward, M 2015, 139). In contrast, products of its 2nd-century workshops have been recorded at numerous military sites in Roman Britain and their concentration in the region between Chester and Carlisle and along the Antonine Wall is striking (Ward, M 2015, 134 fig 3; Wild 2015, 161 fig 3). This led to suggestions that Chester's port may have been a centre for delivery and distribution of such wares for the north-west (Dickinson 2000, 204; Fulford 2007, 68). The preponderance of Montans products, however, is not at Chester, but at Wilderspool, a site thought possibly to have been the lowest crossing-point on the Mersey and conceivably the highest point which larger sea-going boats could reach. Whilst Montans' plain wares have been excavated from various sites in Chester, its moulded bowls here are scarce and, unsurprisingly, no Montans bowls have ever been noted at the amphitheatre. On the other hand, Wilderspool amongst its many Montans imports in general, has revealed a large quantity of its moulded bowls: it seems the probable point-of-entry and the trading-hub rather than Chester (Wild 2015, 160).

Amongst the 160 CG products, there were no early Lezoux products of the so-called 'pre-export period'. One likely instance of form 36 was noted in the arena silts at Silchester (Bird 1989, 81), but these products are rare in northern England. Whilst they have been found elsewhere in Chester, usually in the fortress and sometimes with

Pompeian Red Ware, they are uncommon (Bulmer 1979/80, 16 and 1980, 14; Ward, M forthcoming a). From the amphitheatre, 33 of the 160 CG products were made at Les Martres-de-Veyre, comprising 2.7% of all the samian and *c* 21% of CG vessels. Most of these vessels were Trajanic products (although dated here generally *c* AD 100–120). Some vessels from Les Martres-de-Veyre may have been produced under Trajan or a little later still under Hadrian; those vessels are dated here within the general and very approximate range *c* AD 100–125 (presuming that most of its potters had left for Lezoux by *c* AD 125).

Information concerning stamped or moulded products of Les Martres-de-Veyre will be considered in the relevant sections below, but here the proportions of Les Martres-de-Veyre products at other British sites should be compared. At some sites, a fall in occupation has been suspected or is evident in the Trajanic period, but the so-called ‘Trajanic gap’ in the samian supply at many sites is considered to reflect a contemporary shortfall in Gaulish production (Marsh 1981, fig 11.8; *cf* Ward, M 2011, 79). The proportion of Les Martres-de-Veyre products amongst CG wares at the amphitheatre (21%) is very much greater than at other local sites: 3% from the neighbouring site in the eastern *canabae* at Priory Place, and at Heronbridge, the settlement across the River Dee (Ward, M reports unpublished and in prep). However, the evidence from northern sites varies considerably, depending on functional and indeed chronological factors (compare 9% and 18% of CG wares from excavation of one industrial site at Middlewich and at Carlisle fort, respectively; Ward, M 2008a, 137 and 2009a, 544). Certainly, the large proportion of Les Martres products of the period *c* AD 100–120/5 amongst 2nd-century finds at the amphitheatre may represent a spike in activity in the Trajanic period (followed by a fall-off in samian finds thereafter).

As for exports from East Gaul, only four vessels appear to have been EG products, each found in post-Roman contexts in Area C. In addition, an indeterminate fragment found in Phase 10 resembles some Trier products of the Antonine period; it resembles Trier’s Werkstatt I or II products and was most probably an early-Antonine product (Cat no 60). One or two vessels were probably products of the Argonne workshops (Cat nos 97–8): one flanged bowl of form Curle 21 was probably produced after *c* AD 150. The fourth item is of uncertain origin (Cat no 126), in a ware suggestive of Heiligenberg, if not Banassac, production and most probably produced in the earlier 2nd-century. Thus, the most recent excavations at the amphitheatre have revealed no certainly late 2nd- or 3rd-century products from EG workshops including Rheinzabern’s, although one such product was suggested from earlier excavations (Appendix 3, no 11).

Vessel types and forms

The use of vessel types is largely a matter of modern

presumption; we do not know what use the various samian forms actually served, so we cannot take for granted that all those vessels known to British scholars as ‘cups’ were drinking vessels and that ‘dishes’ or ‘bowls’ were used in eating (Dannell 2006, 158; Biddulph 2008; Webster 2013, 219). Vessel types as we generally term them are listed below according to fabric, by maximum numbers of vessels and proportionately (Table 20). Scraps weighing <1 g are included where vessel types were identifiable, but sherds of indeterminate type were excluded, thus enabling comparison with other assemblages (*cf* throughout: Willis 2005, table 45, charts 14–15 and Willis 2011, table 7, figs 2–3, though based on ‘numbers of vessels represented’).

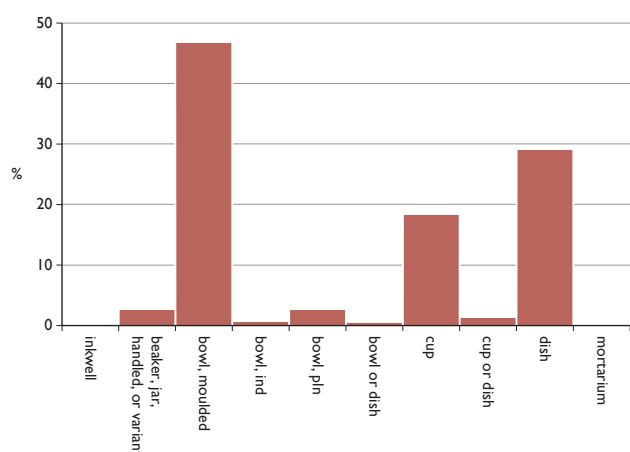
Overall, there is an abnormally large proportion of moulded vessels, including bowls and beakers (Table 20, Fig 227). 402 bowls (maximum numbers) represent 46.5% and 21 beakers (or jars, etc, all presumed to have been moulded) represent 2.4% of the assemblage excluding indeterminate fragments. There is a striking preponderance of moulded bowls (46.5%), and a far smaller proportion of dishes (28.9%), while cups (18.1%), and beakers with related types (2.4%) are relatively well-represented. There were no mortaria and no firm evidence of inkwells. Proportions excluding indeterminate types per Phase are presented in Table 21.

The few vessels in Phases 0, 4, and 3 do not constitute statistically meaningful samples. In Phases 5–7, the preponderance of moulded bowls and the scarcity of dishes is conspicuous, particularly amongst the large body of material in Phase 6. There were only four vessels (all moulded bowls) in Phase 8 and only one, indeterminate fragment in Phase 9. In those deposits where samian ware was residual (although presumably derived from the site), the proportion of bowls and cups evidently decreased while that of dishes rose considerably, as did the representation by 2nd-century CG products in general.

The proportions of vessel types can next be distributed by fabrics, firstly from South Gaul (Fig 228) whose profile unsurprisingly reflects that of Fig 227 and its large body of SG products, though the overall assemblage includes material deposited during post-amphitheatre activity. More meaningful is the range of vessel types in Period 3, whose proportions may be compared with those of SG products from all Phases (Table 22). Comparison of vessel types from Period 3 (Fig 229) with the totals of SG vessels from all Phases (Fig 228) shows the proportion of moulded bowls to be much the same, whilst at Amphitheatre 1 there was a larger proportion of beakers and related vessels and of cups, and a smaller proportion of dishes, than amongst SG finds in later phases. The proportion of cups in Period 3 (22%) thus reached a more ‘normal’ level, lying mid-way between Willis’s military and extra-mural models; the correspondingly smaller proportion of dishes in Period 3 (21%) is a far smaller representation than in groups analysed by Willis (2005, table 45 and 2011, table 7, based on ‘numbers of vessels represented’).

Table 20 All samian ware: vessel types summarised by maximum numbers.

Vessel type	SG	CG	EG	Total	% of total excl ind types
inkwell				-	-
beaker, jar, variant or handled vessel	21			21	2.4%
bowl, moulded	360	42	1	403	46.5%
bowl, indeterminate	1	2		3	0.3%
bowl, plain	20		1	21	2.4%
bowl or dish	2			2	0.2%
cup	129	27	1	157	18.1%
cup or dish	9			9	1%
dish	206	44		250	28.9%
mortarium				-	-
Total excl ind types	748	115	3	866	99.8%
Indeterminate types	296	45	1	342	28.3% of Total
Total incl ind types	1044	160	4	1208	100% (incl ind types)

**Fig 227** Proportions of all vessel types in the samian ware assemblage (866 vessels, maximum nos, excluding indeterminate types).

The evidence of all vessel types from Central and East Gaul is summarised on Fig 230. Whilst four, probably Trajanic, fragments of Les Martres-de-Veyre were found in Phase 7, those CG and EG vessels which were certainly produced in or after the Hadrianic period occurred only in the post-Roman Phases. As Fig 230 indicates, there were no CG or EG beakers or any other enclosed or related vessels, but there was a much larger proportion of dishes (37.3%) and much lower representation by moulded bowls (36.4%) than amongst the SG material. The latter representation thus falls below the average level for moulded bowls in

Willis's extra-mural as well as military groups, while cups (23.7%) as well as dishes lie close to mid-way between the two data-sets (*cf* Willis 2005, table 45 and charts 13–14); however, it should be noted that comparison with Willis's analysis may not be precisely comparable here, derived as it was from groups in variously dated contexts ranging widely both chronologically and geographically across Roman Britain.

The types of vessel identified by their conventional forms are detailed on Table 23. Their standardised catalogue numbers are those of Dragendorff (1895) unless otherwise stated. Forms are listed in approximate order of vessel type as used in Figs 227, 228 and 230, to facilitate comparison with templates elsewhere (eg Willis 2005, table 45 and charts 13–14). Vessel types and forms in assemblages from other amphitheatres are compared (Caerleon: Pryce 1928, 172–8 and Webster 2013, appendix 14.1; Chichester, Stanfield 1926, 158–9; Silchester, Bird 1989, 80–82; London, Bateman *et al* 2008, *passim*). Some amphitheatre samples, such as Chichester's, are too small for statistical analysis and the degree of selectivity in some publications is uncertain. Only at Caerleon is the data closely comparable (see Webster 2013, appendix 14.1).

Whilst we must take care in drawing conclusions as to the actual functions of samian vessels, we can at least consider the varieties of types and forms present. Excluding scraps, only 19% of the vessel total was of indeterminate form. Many forms on Table 23 provide us with chronological information, based on their introductions, developments and cessations over the period of samian production. Of

Table 21 All samian ware per phase: vessel types summarised by maximum nos.

Phase	inkwell	Beaker, etc	bowl, moulded	bowl, ind	bowl, pln	bowl or dish	cup	cup or dish	dish	mortarium	Maximum vessel nos, excl inds	Ind
0									100%		1	-
3			28.6%				14.3%		57.1%		12	5
4											1	1
5		8.6%	43.1%				25.9%		22.4%		58	51
6		3.1%	52.1%		4.2%	1.0%	19.8%	2.1%	17.7%		96	52
7		4.4%	45.7%		2.2%		21.7%		26.1%		65	19
8			100%								4	-
9											1	1
10		6.7%	40%	4.4%	2.2%		26.7%	2.2%	17.8%		45	21
11		2.4%	50%	0.8%	3.2%	0.8%	13.7%	1.6%	27.4%		124	33
12–21 and u/s		1.2%	45.4%		2.3%		17.1%	0.8%	33.2%		485	159
Total	-	2.4%	46.5%	0.3%	2.4%	0.2%	18.1%	1.0%	28.9%	-	892	342

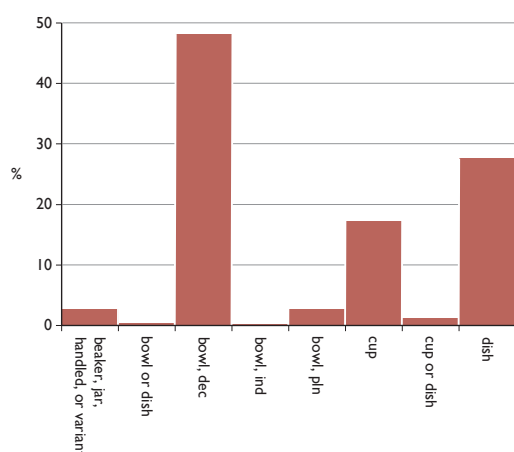


Fig 228 SG vessel-types as proportions of the total (748 vessels, maximum nos, excluding indeterminate types).

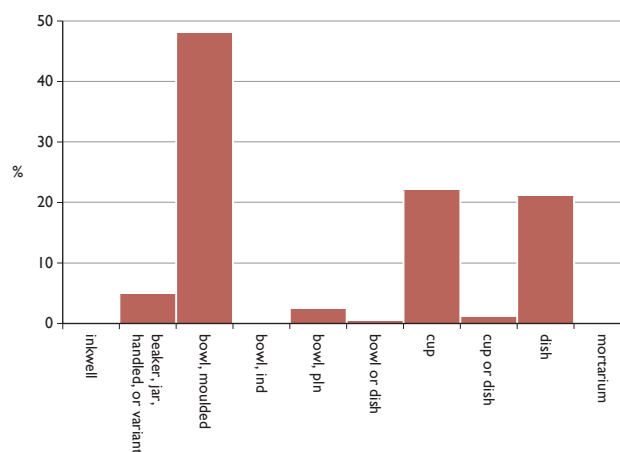


Fig 229 Proportions of samian vessel types from the first amphitheatre (Period 3; maximum nos of vessels).

particular note is the lack of later plain ware and indeed of late samian ware in general, and this is explained by the fact that most of the stratified material comes from sealed refuse deposits dated up to *c* AD 100.

Plain bowls and mortaria

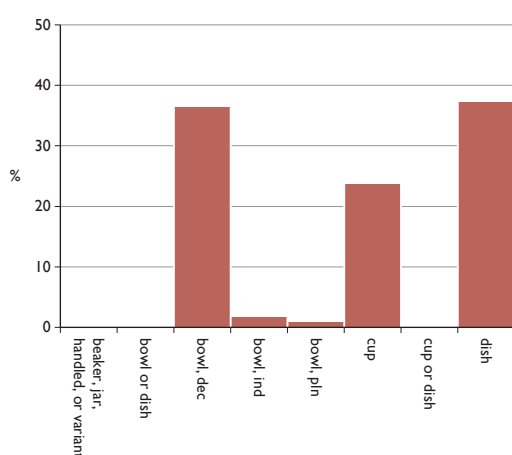
Most of the plain ware bowls were SG products. Of 22 flanged bowls, one was an EG product of Curle form 21 (discussed above), but 20 examples were of SG form Curle 11 and, one flat-flanged bowl was more likely to represent form Ritterling 12 than a very early example of form Curle 11. This bowl may have been amongst the earliest samian finds here: Ritterling 12 was largely a pre-Flavian product, although the latest may have been Vespasianic. This form

was recorded previously from the amphitheatre (Hartley and Morris 1976, 202). It also occurs at other amphitheatre sites. Amongst a sample of 719 identified vessel forms from Caerleon were two bowls of Ritterling 12, and 17 of Curle 11. Chester, amongst its 840 identifiable vessel-forms (866 identifiable vessel types) has a similar representation: 19 examples of Curle 11 and a single example of Ritterling 12 if not Curle 11.

For the later plain wares, other amphitheatre finds may be compared. At Caerleon, they included 12 flanged bowls of form 38 and 2 bowls of form 44 (*cf.* throughout, Webster 2013, appendix 14.1); at Chester there were none. Here the absence of form 38, particularly popular in the Antonine period, is striking. When comparing other amphitheatre

Table 22 Comparison of samian vessel types from First Amphitheatre (Period 3) with SG vessel types from all phases; maximum nos of vessels.

Vessel type	First Amphitheatre (Period 3) samian vessels	% of First Amphitheatre samian vessels excl ind types	SG vessels from all site-phases	% of SG total excl ind types
beaker, jar, handled, or variant	10	5%	21	2.8%
bowl, moulded	96	48%	360	48.1%
bowl, indeterminate			1	0.1%
bowl, plain	5	2.5%	20	2.7%
bowl or dish	1	0.5%	2	0.3%
cup	44	22%	129	17.2%
cup or dish	2	1%	9	1.2%
dish	42	21%	206	27.5%
mortarium			-	-
Total excl ind types	200	100%	748	99.9%
Indeterminate types	123	38.1% of 323 vessels in First Amph.	296	28.1% of 1044 SG vessels

**Fig 230** CG and EG vessel types as proportions of the total (118 vessels, maximum nos, excluding indeterminate types).

assemblages, it must be remembered that each has stratigraphic evidence, and therefore chronology, peculiar to itself. Thus, in contrast to Chester's single example of Curle 21, at Caerleon amphitheatre with its greater Antonine presence, there were five, whilst at Silchester one fragment was perhaps form 38 if not form 36.

No mortaria have been recorded from this assemblage (although the less well-stratified finds from earlier excavations were not published). These vessels are a good indicator of late-Antonine and 3rd-century activity, as they

cannot have arrived in Britain before *c* 170 (see Ward, M 2008b, 178; Ward, M 2011, 82, 105 note 5; Ward, M forthcoming a), it is thus unsurprising that they do not occur in the large groups from the site. The same is true of the shortage at the amphitheatre of flanged bowls of form 38 in the 2nd century. There may also be functional reasons for their absence in deposits associated with the use of Amphitheatre 1; form 38 may have been a bowl used primarily for mixing and the (gritted) mortaria are generally presumed to have been used for grinding. The shortage of mixing bowls and the absence of grinding vessels might not seem surprising. Coarseware mortaria were, however, present; so too were samian examples at Silchester and Caerleon amphitheatres, and their ritual use would not be anomalous (*cf* Dickinson 1997, 945). Nonetheless, this late samian product was absent from London's (generally early) amphitheatre assemblage, just as no examples have been published from Chester's.

Cups

Whereas cups (and especially form 27) were the most common type at London amphitheatre, the proportion of cups at Chester was remarkably small (18.1% of the overall total). In Amphitheatre 1 contexts they reached 22% (Table 22); this proportion lies mid-way between those calculated for military and extra-mural assemblages, if groups from divers and diverse contexts are comparable (Willis 2005, table 45). While the differing sample sizes across phases at Chester's amphitheatre must be borne in mind, it is clear

Table 23 All samian ware: vessel forms summarised by maximum nos.

Form	SG	CG	EG	Total
Déchelette 67	17			17
Hermet 7 or 15B	1			1
29	37			37
29 or 37	13			13
29, 30 or 37	1			1
30	12	1		13
30 or 37	9	1		10
37	285	40	1	326
37 or 38		1		1
Curle 11	19			19
Curle 11 or Ritt 12	1			1
Curle 21			1	1
24	1			1
27	104	20		124
27 or 35	4	1		5
35	14	1		15
33	2	5	1	8
35 or 36	7			7
36	7	3		10
15/17	6			6
15/17 or 15/17R	9			9
15/17R	4			4
15/17 or 18	15			15
15/17 or R or 18R	2			2
18	32			32
18 or 18/31	13			13
18 or 18R	46			46
18/31		11		11
18/31 or 18/31R		2		2
18/31 or 31		5		5
18/31R	2	7		9
18/31R or 31R		5		5
18R	48			48
18R or 18/31R	15			15
31		2		2
31 or 31R		1		1
31R		3		3
Curle 23		1		1
Walters 79 or 79R		1		1
ind	318	49	1	368
Total	1044	160	4	1208

that the presence of cups declined from Phase 5 to Phase 6, just as bowls (both plain and moulded) increased. The proportion of cups decreased from Phase 11 onwards, while bowls and dishes were in greater abundance and reflected the greater representation of later 2nd-century vessels in the post-amphitheatre phases.

There was little evidence of diagnostically pre-Flavian cups. One cup of form 24 was identified, and appeared most likely to have been a Neronian product (Cat no 51). This form has been found at most British amphitheatres, including occasional instances in each of the differently sized assemblages at London, Silchester, Chichester, and Caerleon. Often published as 'form 24/25', distinction between fragments of Dragendorff's forms 24 and 25 is not possible without a surviving handle. The common usage of 'Dragendorff form 24/25' adopted by Oswald and Pryce (1920, 171) appears originally to have indicated different variations of the form: Drag 24 was the 'normal' cup form in standard samian ware; Drag 25 was the early form with small spiral 'handles' characteristic of the Augustan-Tiberian prototype and unlikely to have reached the Flavian north (Ward, M 2015, 149, note 2). Thus, Chester's examples were presumably form 24. Aside from Cat no 51, some fragmentary bases or footrings were not firmly identifiable as form 24 or other early cup forms but, for instance, Cat nos 84–5 may otherwise have been (unusually) stamped examples of form 35 or 36.

The function of samian cups is debated: some 'cups' may have been used for mixing liquids or foods, while others were surely used for drinking (Dannell 2006; Biddulph 2008). Here, the standard forms 27 and 33 will be termed 'cups', while evidence of wear from use has been catalogued. The relationship of these forms, 27 and 33, is revealing in chronological terms: form 27 is generally considered to have fallen out of production by *c* AD 160, replaced by the simpler and increasingly common form 33. The latter from its 1st-century origins had grown in favour, and production reached its zenith in the Antonine period. In this assemblage, there were at least 104 SG cups of form 27, but only 20 CG instances (of which *c* 6 were products of Les Martres-de-Veyre in the period *c* AD 100–125). Of the examples of form 27 or 27 g, at least 8 were very small vessels (rim diameters 8 cm; footrings 3 and 4 cm) and all eight were SG products (see Monteil 2013, 352). Amongst all SG form 27 cups, there are 15 surviving footrings: 10 were grooved (form 27 g), whilst the remainder were generally scraps of which some were ungrooved (form 27). In contrast, in Usk's (mostly early) assemblage and in a large assemblage from Carlisle fort, the surviving footrings of form 27 were all grooved (Tyers 1993, 134; Ward, M 2009a, 543, table 13).

At the amphitheatre, SG examples of form 27 overwhelm SG form 33 in the ratio 104:2 (52:1), and amongst the CG and EG products, their ratio was at least 20:6 (10:3). This may be compared with Priory Place (Ward, unpublished) where cups of form 27 outnumbered

by form 33 in the overall ratio 45:92 (*c* 1:2), with 25 SG and 20 CG cups of form 27, compared with 7 SG and 85 CG examples of form 33. On sites presumed to have been steadily occupied in the Antonine period, 2nd-century cups of form 27 were regularly outnumbered by those of the increasingly popular form 33. That the reverse was the case at the amphitheatre (in that form 27 had fallen into disfavour by *c* AD 160) reflects the date of the larger assemblages and the consequent general lack of later 2nd century samian products.

Dishes

The unusually small representation of dish types (28.9% of the overall total) is almost identical to that remarked on as abnormally small at London amphitheatre (Bateman *et al* 2008, 172). This is especially evident amongst the SG products, where 27.5% were dishes. At Priory Place as much as 31% of 165 SG vessels were dishes (Ward, M unpublished). In Amphitheatre 1, the proportion of dishes was only 17.7% in Phase 6 (rising to 26.1% in Phase 7). That their proportion reached 33% in post-Roman residual assemblages of Phases 12–21 is partly due to the quantity of CG products overall: dishes comprised 38% of CG vessels, a far more ‘normal’ representation if comparable with variously dated groups from various military or extramural sites (Willis 2005, table 45). At the amphitheatre, sherds from up to 17 SG vessels were identifiable only as being of form 15/17 or 18 and their rouletted varieties; their uncertain identification results from fragments lacking the distinctive junction of wall and base or a rim. The likelihood is that many were of form 18, which became the more popular as the Flavian period progressed: in all, 34–36 SG dishes were of the 15/17 group, while at least 156 SG vessels belonged to the 18 and 18/31 groups (including rouletted varieties). Comparison might be made with the 1960s’ finds (Thompson 1976, 204–6), but the degree of selectivity in its data-collection is unclear. At the recent excavations, six or seven examples of form 18 or 18R showed the pronounced external offset at the wall/base junction which seems to suggest production in the Neronian or early Vespasianic period (see Usk’s Neronian fortress finds; Tyers 1993, 133).

Of the CG dishes, *c* 20–25 were of form 18/31 and 18/31R, produced before *c* AD 145/50 and *c* AD 160, respectively. Only 6 vessels certainly (but 16 conceivably) were of the succeeding 31 or 31R group. Three were certainly form 31R, the rouletted, deep dish in the developed version which is considered not to have been produced before AD 160 and of which examples are ubiquitous on sites under steady occupation in the later-Antonine period. Where the ratios of forms 18/31 to 31 and 18/31R to 31R are greatly skewed towards the earlier types (as here) this can be taken to indicate an emphasis on the Hadrianic and early-Antonine periods. At the amphitheatre the relative frequency of forms 18/31 and 18/31R to 31 and 31R was 11:3, at the very least. At Ribchester, their

ratio was *c* 5:3 (34:21) at a site where the samian dating was taken to support lower intensity of occupation from *c* AD 150/160, or cessation of occupation not long after AD 160 (Dickinson 2000, 204; see Willis 2005, 5.3.2.6). At the amphitheatre it is striking that no more than three examples of 31R were certainly identified, and only in post-Roman residual contexts. Furthermore, only one other plain vessel is likely to have been of later-Antonine origin. Represented by a badly burnt and incised fragment of dish form Walters 79 or 79R, this had seen unusual reuse (see below and Cat no 136).

Beakers, jars and other unusual vessels

Small, ‘cup-like’ forms, whether enclosed or unenclosed, might be presumed to have been used for drinking (rather than ornamental) purposes. Regardless of their actual function, it is perhaps fair to assume that their contents were liquid. However, as discussed above, even the use of the conventional ‘cup’ form 27 has been called into question. Overall, the 21 beakers, jars, handled, or other such vessels comprised a large proportion of the assemblage (2.4%). Examples of the most common of the early (largely Flavian) beakers, Déchelette form 67, were relatively abundant at the amphitheatre excavation: these 18 beakers comprise 2.1% of the assemblage and 2.4% of SG products, discounting indeterminate types. This may be compared with finds from Priory Place, where similarly, *c* 2% of 165 SG vessels were beakers (Ward, M unpublished). Only one rim and no footrings survived at the amphitheatre, rendering impossible any comparison with Webster’s (2006) overview of the form’s variations.

All surviving fragments of decoration on form 67 here were moulded, except one *en barbotine*. As Webster (2006, 32) concluded, a separate department may have been operating within the workshop, using its own poinçons, moulds and personnel. The examples of decorated form 67 from Chester amphitheatre are all small scraps. It is therefore difficult to find parallels amongst those illustrated by Hermet (1934, pl 90.6–40; pl 91.1–10). Depending on context, one might have expected examples of gladiatorial decoration on some beakers: Oswald’s type 1007 was found on form 67 at Pen Llystyn (Simpson 1968, 167.24). However, figures are relatively rare on form 67 and only scraps of beakers have survived at the amphitheatre. At the 2003 excavation, it was cupid (Osw 501) who appeared on SG form 67 (see Appendix 3, no 10).

During Newstead and Droop’s excavations (1932a, 17) a beaker of form 67, not published in detail, was found in the packing round a post hole near Entrance 10 which is tentatively identified as an aspect of Phase 6 (p 122); it was found in association with a cup of form 27 stamped by Albanus ii, AD 60–80 (Appendix 2). The two may well have been in contemporary use (see Webster 2006, 21). At the most recent excavations, 18 beakers were found amongst the 1,208 SG vessels (748 excluding indeterminate types). Both their quantity and their proportions are comparable with the finds

from the Carlisle Millennium excavation, where between 10 and 18 beakers were found amongst 846 SG vessels (Ward, M 2009a, 543, table 13). Even larger proportions were recorded at specific locations such as Ribchester: there, beakers comprised 5% of the samian assemblage of all periods (Dickinson 2000, 204). At such sites where the beakers were relatively frequent, batched deliveries of vessels may be suspected. It might seem significant that their proportion at Chester's amphitheatre (2.4%, all SG) was exceeded at Caerleon's (3.5% of 719 vessels), but at the latter, these types included only two beakers of form 67, there being four CG beakers of Antonine origin.

Other, more open, moulded forms such as Knorr 78 have been recorded at British amphitheatres (eg one each at Silchester and Caerleon, and a gladiatorial instance at London). So too, Hermet 9 (perhaps an early version of Knorr 78) occurred at Caerleon. These forms were not identified at the recent Chester excavations, but Knorr 78 was recorded previously (eg Newstead and Droop 1932a, 23, no 10–a). Early representation of Knorr 78 was noted at Hofheim Erdkastell (Mees 1995, 58), but it was also found late in the 1st century, in the Bregenz Cellar (Jacobs 1913, nos 2, 22, 25) with which many of the amphitheatre finds were contemporary. Records of Hermet 9 are rarer in the north, unsurprisingly so if this was an earlier form. However, Webster (2006, 32) has questioned how often fragments representing Hermet 9 are distinguishable from Knorr 78. At any rate, Hermet 9 occasionally reached the north-west, including Carlisle fort (Ward, M 2009a, 553 no 1). Whilst no examples of either form are known at Chester amphitheatre, some recent finds were of uncertain form. A few fragments with slightly rounded profile represented extremely thin-walled moulded products, very small bowls, if not beakers or cups: if enclosed vessels, such as form 67, then their interiors were smoothed and left any finger-rilling marks or throwing lines barely discernible, if not absent. The rounded variety of Hermet 9 might have been suspected (Stanfield 1936, fig 3, nos 8–10; Webster 2006b, fig 6, nos 2 and 4), but, following Webster's observations (2006, 28), their smoothed interiors appear to exclude this form also. The base of another SG product, Cat no 82, bore similarities to the inkwell form Ritterling 13, but with its interior well-slipped and well-smoothed, unlike those of (enclosed) inkwells (Webster 1996, 72; Willis 2005b, 97). Without an inkwell's internal flange, this might result in a rounded version of form 22 (Stanfield 1929, fig 4.14); however, the amphitheatre vessel's type and form remain uncertain.

Another unusual vessel was handled (Cat no 54). The surviving fragment appears to represent Hermet's form 7 or 15B, illustrated by Passelac and Vernhet (1993) and discussed by Webster (2006). Showing similar ergonomic shape to that of the modern mug-handle, this handle's cross-section may represent either a small lagena, Hermet form 15b, or a large double-handled jar/beaker, Hermet 7 (1934, pls 4–5; Webster 2006, 23, fig 4 and 26, fig 5):

a variant of these forms, Hermet 7/15, was published by Vernhet (1986, 97). Examples of Hermet 7 are difficult to identify in Britain, but occasional *lagenae* are known at, for instance, Hartlip (signed by Sabinus iii), London, Colchester's burnt level, Exeter, Baginton and Wroxeter (Oswald and Pryce 1920, pl 85.2; Stanfield 1929, 114–17; Balsan and Vernhet 1971, 74–5). Sabinus iii may have been the form's protagonist, his activity dated AD 50–80 (*NoTS* 2011, vol 8, 27). Pre-Flavian origin was ascribed to both types by Passelac and Vernhet (1993, 576) who dated production of Hermet 7 to the period AD 50–70 and of *lagenae* from the pre-Flavian to Trajanic periods. Webster (2006, 31) considered La Graufesenque's 'less common moulded forms' predominantly Flavian, but some *lagenae* which reached Britain were presumably Neronian products. The general appearance of the Chester piece suggests Neronian or early-Flavian production. Mees raised the possibility that *lagenae* of form Hermet 15 had ritual use, with Sabinus iii depicting on it scenes of sanctification, and himself perhaps being the *flamen* mentioned in a kiln-tally at La Graufesenque (Mees 2012, 49, and 52, fig 6.12).

Whether or not there was any ritual significance amongst the amphitheatre's samian assemblage, there were many unusual forms. Previous finds included a plain bowl of form 37, highly unusual in that this form is a standard moulded bowl (Hartley and Morris 1976, 206, no 90). Similarly, amongst unusual finds at other amphitheatres were Caerleon's form 30R and 37R, rouletted versions of the standard moulded bowls.

Moulded bowls

The overall proportion constituted by moulded bowls was exceptionally large: 46.5% (Table 20). At Caerleon amphitheatre, they comprised 33% (Webster 2013, appendix 14.1). While this Chester assemblage included possibly a single EG moulded bowl, 360 SG moulded bowls constituted 48.1% of the SG products, whilst 42 CG moulded bowls constituted only 26.3% of the CG products respectively. However, amongst the latter's 31 identifiable vessel types from Les Martres-de-Veyre, more than half were moulded bowls, with comparatively few cups and dishes: thus, the pattern left by these mostly Trajanic products is, unsurprisingly, closer to the SG assemblage (produced by c AD 110/120) than to the later 2nd-century CG products.

Moulded bowls of form 29 versus 37

The relationship of moulded bowl forms 29 and 37 is of chronological significance. Form 29 was long considered out-of-production at La Graufesenque by c AD 85, but recent findings indicate extension a few years later, perhaps to c AD 90. Form 37 is considered to have come to the fore shortly after its first appearance following the death of Nero (Dannell 2012, 62). The arguments for dating samian ware can be circular. However, Wild (2012, 238) points out that in an assemblage dating to c AD 70, one would

expect form 37 to be a rare occurrence, but that by *c* AD 80 quantities of form 37 bowls had achieved approximate parity with those of form 29. On the other hand, Willis (2005, 5.3.2.4) had noted that, according to his database, parity was reached between AD 87 and 89.

Amongst the certainly identified forms in this Chester assemblage, the ratio of form 29 to form 37 was 37:285 (almost 1:8; Table 26). Comparison may be made with Flavian foundations where the methodologies are compatible and the data sufficient. A ratio of 1:6 was recorded amongst Carlisle fort's Millennium assemblage as a whole and also in Lancaster *vicus* (Ward, M 2009a, 541; Ward, forthcoming b). However, in a specifically earlier-Flavian group, we might expect form 29 in a larger proportion. Thus, at Castleford's fort and *vicus* in Phase 1 groups with an end-date in the range *c* AD 73–86, the ratio reached 101:36 and 22:14, respectively (Willis 2005, table 5). However, there are clear discrepancies between assemblages, sometimes resulting from sample-size as well as from variations in the nature and extent of activity. In the Flavian forts at both Hayton and Red House, Corbridge, parity of forms 29 and 37 was not closely approached, with ratios of 1:8 and 4:12 recorded in groups given end-dates *c* AD 70–80 and *c* AD 75–95, respectively. Chronological factors are clearer elsewhere. At Cardean in Flavian Scotland, no new 29s after *c* AD 85 were recorded, and foundation in the 90s was proposed (Wild 2012, 238). In the industrially related occupation at Walton-le-Dale, Lancs, only one form 29 was found amongst over 2,000 vessels, while no form 37 bowls were dated *c* 70–90. There, foundation was suggested as being possibly 2nd-century (Wild 2012, 238).

Whether the most influential factors were variations in nature and extent of activity or in sample-size, the amphitheatre's site-phasing needs consideration. In Pre-amphitheatre Phase 3, 12 vessels were excavated; amongst these, one bowl was of form 29, one was form 30, but none was form 37. However, like Phase 4 (with its single vessel), the Phase 3 sample is not statistically meaningful. In Phase 5, 109 vessels included forms 29 and 37 in the ratio 7:17 (1:2.4). This may be compared with 148 vessels in Phase 6, where certain examples of form 29 were overwhelmed by form 37 in the ratio 4:40 (1:10). Simplistic analysis of the ratio of form 29 to 37 implies that the accumulation of samian ware from (if not before) Amphitheatre Phase 5 and onwards occurred after AD 85/90, with evidence in Phase 6 pointing towards the accumulation of material some years after 85/90. These factors are important in the dating of Phase 6 and the construction of the Amphitheatre 1b to *c* AD 100.

Moulded bowls and site status

The overall proportion constituted by moulded bowls was exceptionally large (46.5%). At Caerleon amphitheatre they comprised the still larger proportion of 33% (Webster 2013, appendix 14.1). While there may have been only one EG moulded bowl in the Chester assemblage, 360 SG moulded

bowls constituted 48.1% of the SG products. In contrast, 42 CG moulded bowls constituted only 26.3% of CG products, although moulded bowls were (as usual) frequent amongst the products of Les Martres-de-Veyre: of 31 of its identifiable vessel types, more than half were moulded bowls, while there were comparatively few cups and dishes. Decorated samian ware appears to have been more costly than plain ware and is considered to signify high-status occupation and (usually) military activity. This was surmised concerning the samian assemblage from the industrially related extra-mural settlement at Middlewich with its large decorated assemblage (see Ward, M 2016, 91). In those terms, the exceptionally large proportion of decorated vessels at the amphitheatre is unsurprising, whatever their actual function.

'Small bowls'

Aside from the great quantity of moulded vessels, there is a remarkable presence of unusually small bowls of form 37: at least ten; where measurable, their rims were of diameter 15–17 cm and footrings 7–8 cm. All were found in post-Roman contexts, none before Phase 11a (Table 24). Although four were CG products, made in the Trajanic or Hadrianic periods (three at Les Martres-de-Veyre), six were SG products made in the Flavian, or some possibly in the earlier-Trajanic, period. At London amphitheatre, small bowls from South Gaul were exemplified by the potter M. Crestio (Bird 2008, 185, RP173). However, moulded bowls of unusually small size are recorded mostly amongst Lezoux's Hadrianic-early Antonine products and such items are known at various north-western locations, including Middlewich (Ward, M 2008a, 139), Carlisle (Castle Street; Dickinson 1991, 364) and Walton-le-Dale. At Walton-le-Dale ten were noted amongst 63 CG moulded bowls (Wild, forthcoming, and pers comm).

Table 24 'Small bowls', in order of Site Phase, Area and production-date

Area	Context	Cat No	Phase	Fabric	Production date-range, <i>c</i> AD
A	441	64	11a	SG	75–100
A	411	75	11b	SG	85–100/110
A	411	78	11b	CG	110–130
B	2569	74	11b	SG	75–90
A	431	108	Post-Roman	SG	75–90
A	431	109	Post-Roman	SG	80–110
B	2425	103	Post-Roman	SG	70–100
C	3068	120	Post-Roman	CG	100–120
C	3045	122	Post-Roman	CG	115/120–140
C	3067	121	Post-Roman	CG	120–140?



Fig 231 Small gladiatorial bowl (Cat no 75).

The decoration of small bowls is usually not attributable to specific potters and the work of apprentices has been suggested. The particularly small size of some products has raised the question whether such ‘apprentices’ were perhaps children or women (eg Webster 2001, 296; 2006, 32–3). Whilst it has been argued that moulding bowls and the related tasks were too specialised to be given to women or children in a highly skilled Romano-Gallic industry, examples from Lezoux are often listed as being of unusual, or poor, appearance. So too, amongst the amphitheatre’s SG and CG instances, their quality varies from excellent to very poor: *cf* Cat nos 108–109. The latter, like a small bowl at Middlewich (Ward, M 2008a, 122 no 33), is of exceptionally poor quality and may well have been a factory ‘second’, so poor was its moulding. Another example (Cat no 110), was very indistinctly moulded and, showing no ovolo, it was perhaps wiped off by the bowl-maker rather than omitted by the mould-maker. If a Flavian product, it seems very poor work and, if not merely a ‘second’, it may perhaps indicate the hand of an apprentice.

That the ‘bowl’ form Dr 37 in some cases (Dannell 2006, 158) had drinking connotations perhaps encouraged the more wide-sweeping proposal that, ‘The traditional use of the relatively expensive Form 37 was, in all probability, as a communal drinking bowl,’ as reported concerning Bryn Eryr in Gwynedd (King 1998, 213). However, whilst (mostly) later-Roman carousal habits at one site may have had some bearing on its selection for use in North Wales,

many ‘small bowls’ of form 37 – including those at the amphitheatre – were assuredly too small for communal use. Nevertheless, some drinking use cannot be ruled out for some moulded ‘bowls’. Form 30 has been suggested as possibly functioning as an individual drinking vessel (Dannell 2006, 158) and, regardless of its function, at least 13 examples of form 30 were identified from these Chester amphitheatre excavations.

Small gladiatorial bowl (Figs 231, 262)

Amongst the ‘small bowls’, one example stands out. This was a miniature bowl, cup-sized and depicting gladiators, cupids and a dolphin; it was recovered in large pieces from Area A, in a robber trench of Phase 11b cut through the Phase 7 strata relevant to the use of Amphitheatre 1b (Cat no 75). Here, such a small bowl, one that seems an irregular product and one that displays gladiators so prominently, may well be significant (see Note on Iconography). Whatever the purpose or function of this vessel, it appears to have seen little use. It was found in the same context (411) as three CG bowls of early-2nd century origin (one repaired, another ‘small bowl’, and the third unusually chunky), alongside a bowl of SG form 37 with a shaved-down foot, of which part was deposited in Phase 11a (Cat nos 76, 78–79, and 63).

Vessels used in food consumption might be considered less likely to have been brought as personal possessions to the amphitheatre, than to have been bought on site or used

Table 25 Samian stamps attributable to specific potters.

Potter	Potter's activity (date-range in NoTS)	Die	Estimated production date- range of the pot, c AD	Site phase	Catalogue No
Silvanus i	30–80	8h	c 55–70?	10	51
Cunarus i?	55–80	2a/2b?	c 55–80	Post-Roman	84
Iustus i or Iulius ii?	60–85 or 70–90?		c 60–90	Post-Roman	86
Q. Iulius Habi-	65–90	1a	c 65–80/85	3	2
Pontus	65–95	24a	c 65–80	5	6
Severus iii	65–95	7t	c 65/70–95	6	21
Vitalis ii	70–100	23b"	c 70–85	11b	72
Cosius Iucundus	75–110	1a	c 75–85/90	6	22
Cosius Iucundus	75–110	1a'	c 90–110	Post-Roman	90
Virilis ii?	80–105	6c?	c 80–100/105	Post-Roman	88
Ego	80–110	1a	c 80–100/110	Post-Roman	89
L. Tr- Masculus	85–105	4a	c 85–105	5	8
Sulpicius	85–110	8a	c 85–110	11b	70
C. Iulius Primig- Sur-	90–120	3a	c 90–110	10	52
Gabrillus i	130–155	New die	c 130–155	Post-Roman	91
Severus vi	160–210	12a? (Severus vi)			
or Severus v?	or 125–150	or 3e? (Severus v)	c 125–160/170	Post-Roman	92

by Games' organisers to serve participants at banquets. They might perhaps have been provided by vendors dispensing the drinks purchased by 'punters'. They could have been on offer in one of the external stalls, thus providing *panem et circenses* ('bread and circuses') in a description brought to 2nd-century notoriety by Juvenal (*Sat.* 10.81). The possible presence of timber-framed stalls immediately outside the First Amphitheatre has been proposed as providing 'snack food' to spectators (Wilmott 2008, 178; p 160). If samian vessels were used in an almost 'pub-like' situation at the Games, this might call into question the traditional concept of samian ware as a particularly expensive form of pottery diagnostic solely of high-status activity. At any rate, cosmetic 'seconds' appear here (as at the London amphitheatre; Bateman *et al* 2008, 187) and here some of the small bowls, including the gladiatorial miniature, were not first-class products.

Various reasons for the presence of gladiatorial bowls at an amphitheatre may be suggested, whether as vessels for 'fast food', for use in ritual banquets or indeed by enthusiasts, perhaps as souvenirs. Souvenirs may have been on sale from the stalls or booths located outside amphitheatre walls. Putative souvenirs in other materials

elsewhere have included enamelled vessels depicting or relating to Hadrian's Wall (Breeze 2012, 18–22, 107–111) and glass 'sports cups', whether moulded or painted (Bateman *et al* 2008, 130; Birley 2008, 23). Gladiatorial souvenirs in samian were thought less likely at London amphitheatre due to the size and condition of the specific vessels (Bateman *et al* 2008, 129, 135). Whilst again not a top-class product, Chester's miniature gladiatorial bowl probably served some special intention, perhaps as a souvenir.

Stamped and/or decorated vessels

Of 27 potters' stamps or fragments thereof, three have no legible letters. Of 403 moulded bowls, 309 retain some decoration. All 18 beakers (from South Gaul) were probably decorated originally, but only seven have decoration surviving, one *en barbotine* and the remainder moulded. Details of stamped and/or decorated vessels are provided in the catalogue.

Potters' stamps

All stamps are detailed in the catalogue, but the only examples illustrated are those which are not illustrated in, or

not identified from, Hartley and Dickinson's *NoTS* volumes. Of the 27 potters' stamps or fragments of stamps (Table 25), three have no legible lettering and a fourth (Cat no 62), though complete, is illegible and apparently meaningless. Of 16 stamps for which attributions are possible, only two were by the same potter (Cosius Iucundus), one apparently representing his later activity. While 25 stamps represented SG potters, only two represented CG potters working at Lezoux in the Hadrianic or Antonine periods. Three potters featured amongst those whose stamps were previously excavated at the amphitheatre; their distribution is seen in Appendix 2.

Of the SG stamps, one found in Phase 5, Area A, (625) was made by Pontus, probably *c* AD 65–80 if not before. It was found amongst the scraps weighing <1 gram (Cat no 6) and provides excellent argument for examining all samian ware from excavations. Only two of the 24 stamps with letters decipherable were thought likely to have been pre-Flavian products: the earliest potter here was Silvanus i, active AD 30–80, represented by a cup of form 24 that was probably a Neronian product (Cat no 51). The latest stamped SG pot may well have been a dish (Cat no 52) by C. Iulius Primig- Sur- using a die (3a) recorded previously, and also on form 15/17R or 18R, at the amphitheatre (Hartley and Morris 1976, 206; fig 34.8). This potter worked at La Graufesenque in the period AD 90–120; the dish does not look especially late, and La Graufesenque's exports to Britain have generally been considered to have ended by *c* AD 110, although (as discussed below) this may be a subject for debate.

There were only two stamped vessels from Central Gaul and they represented Lezoux potters. The absence of stamps from Les Martres-de-Veyre here is paralleled in Middlewich's industrial site (Ward, M 2008a, 139), whereas at one excavation in at Carlisle fort, 30% of CG stamps originated at Les Martres-de-Veyre (Ward, M 2009a, 545). The amphitheatre's Lezoux stamps included one by Gabrillus i, active AD 130–155 (*NoTS* 2009, vol 4, 126), apparently from a die not previously recorded. The second stamp is less certainly dated, but the vessel was probably not made after the 170s.

Moulded bowls – decoration

Of 403 moulded bowls, 77% retained some element of the decoration (Table 26). However, most of these 309 'vessels' were fragmentary: 52 were represented by mere scraps weighing >1 g, and only 32 scraps retain decoration. Whatever the means of statistical analysis (discussed above), a very large proportion of the assemblage comprised moulded bowls: 46.5% according to maximum vessel numbers. Their quality varied from excellent to very poor, with the poorer examples including the 'small bowls' discussed above.

South Gaulish moulded bowls

In any assemblage of SG samian ware, one expects a large

Table 26 SG moulded bowls with decoration surviving (maximum nos).

Form	Production period	Vessels (max nos)
Dr 29	Neronian-early Flavian	8
	Early Flavian	5
	<i>c</i> AD 70–90	9
	<i>c</i> AD 75/80–90	2
Dr 29 or 37	Uncertain (fragments)	14
Dr 30	Neronian-early Flavian	2
	Neronian-Flavian	2
Dr 30 or 37	Early Flavian	1
	Flavian	3
Dr 37	Early Flavian	12
	<i>c</i> AD 70/75–90	30
	<i>c</i> AD 80–100	19
	<i>c</i> AD 80–110	54
	Late-Flavian or Trajanic	3
Indeterminate type	Neronian or Flavian	2
Déchelette 67	Early Flavian	2
	Flavian-Trajanic	6
Decorated vessels, total		174

proportion of moulded bowls. However, that of 48% in this assemblage is exceptionally large and their chronological evidence is significant. It should be reiterated here that, for moulded bowls lacking stamps, the use of date-ranges such as *c* AD 70–85 or 70–100 should not be thought more accurate than the traditional use of epochs, but reflect generally and only approximately the conventional usages of 'early Flavian', 'Flavian', etc.

Of 360 SG bowls, 21 could possibly have been pre-Flavian products; however, they are fragmentary and imprecisely datable within the Neronian-Flavian period. 276 bowls retain decoration, however fragmentary. Only two *ovolos* (on form 30) are likely to represent later-Neronian to Vespasianic bowls (Cat nos 71, 99). During the 1930s' excavations, a pre-Flavian bowl of form 29 was found along with a coin of Vespasian, in a dump of material 'about fifteen feet west of the arena wall'; it was said by Felix Oswald to be 'early Claudian' (Newstead 1948b, 100–101, fig 15, no 2). Later, recovered in 1964 'from the seating-bank make-up' was a bowl of form 29, said to be typically Neronian, dated *c* AD 50–65, and presumed to have survived long in use (Hartley and Morris 1976, 202).

The great majority of decorated bowls were clearly of Domitianic origin. Amongst these bowls, the decorative styles of potters known as M. Crestio and Crucuro i are frequent. For whatever reason, the material catalogued

Table 27 CG and EG moulded bowls with decoration attributable stylistically to specific potters or workshops (maximum nos).

Period	Fabric	Potter (attributed stylistically by decoration)	Vessels (max nos)
Trajanic	Les Martres-de-Veyre	Potter of the Rosette	1
		X-2	1
		X11	1
		Igocatus (X-4)	2
Trajanic to early-Hadrianic	Les Martres-de-Veyre	Drusus i (X-3)	1
		Unidentified, probably Trajanic	4
Later Trajanic to earlier Hadrianic	Les Martres-de-Veyre	X-13	1
Hadrianic	Lezoux	Geminus iv (or Drusus ii)	2
(Hadrianic?)	Les Martres-de-Veyre	Large S potter	1
Hadrianic to early Antonine	Lezoux	Sacer-Attianus?	1
		Quintilianus group?	1
Late Hadrianic or early Antonine	Lezoux	Cinnamus ii or early associate	1
	Early EG	Uncertain	1
Early Antonine	Lezoux	Servus ii or P-15	1
Early to mid Antonine	Lezoux	Cinnamus ii	1
Mid to late Antonine	Lezoux	Divixtus, Advocisus or related style	1
		Cinnamus ii or Casurius ii	1
		Casurius ii	1
		Attributable bowls, total	

resembles more that from the Cala Culip IV wreck (which occurred ‘most probably between AD 78 and 82’: B Hartley in Nieto and Puig 2001, 32), than at Pompeii’s destruction in AD 79 (Atkinson 1914; Dwiza 2004). Certainly, some decorated bowls in this amphitheatre assemblage are of late appearance (eg Cat nos 121–123).

Central Gaulish and East Gaulish moulded bowls

In the assemblage of CG products excluding indeterminate forms, 42 moulded bowls comprised 26% (Table 20). While this is a much smaller proportion than amongst the (largely 1st-century) SG vessels, or than the proportion of 36% at Priory Place (Ward, M unpublished) or 43% at King Street, Middlewich (Ward, M 2008a, 142 table 29), it is close to the proportion of 27.5% from the Carlisle Millennium excavation (Ward, M 2009a, 543).

Amongst the CG moulded bowls, the products of Les Martres-de-Veyre comprised as much as 38%. The proportion of its moulded bowls is usually large (Darling 1998, 176) and at the amphitheatre they comprised as much as half. Twelve of its Trajanic or early-Hadrianic moulded bowls here retain elements of decoration. At least one was

produced in the Hadrianic period, but more of the material dated here within the Trajanic-Hadrianic range may in fact have been produced in the early-Hadrianic period. This remains a moot point. Ioenalis, for instance, was active AD 100–130, working almost entirely at Les Martres-de-Veyre (*NoTS* 2009, vol 4, 291). Numerous bowls could have been produced by him in the Hadrianic period, and the decorative styles of the moulded bowls on which his stamps were recorded by Hartley and Dickinson range across those of the anonymous mouldmakers from X-2 to X-8, X-11 and X-12. While no stamps by Ioenalis or his contemporaries survive at the amphitheatre, several anonymous styles (including X-2 and X-11) are represented. Bowls in the style of Cettus, the prolific potter of the later-Hadrianic to early-Antonine period at Les Martres-de-Veyre, occur elsewhere in Chester, but none was present here.

At the amphitheatre, the evidence of plain and moulded vessels produced at Lezoux in the Hadrianic-early Antonine period peters out largely after *c* AD 150/160 (Tables 23, 27 and histograms, Figs 232, 233). Here, even the ubiquitous products of the most prolific CG potter, Cinnamus ii, who was probably active *c* AD 135–175 at Lezoux (*NoTS*

2008, vol 3, 130) are scarce and they were all found in post-Roman contexts: see Cat nos 80, 124 and, from (3081), a fragment of Cinnamus' standard ovolo B143. Although an increase in CG supplies is observable in the Antonine period, there were relatively few moulded bowls attributable to specifically Antonine potters. None of the bowls was certainly made after the 180s and they may indeed have been produced no later than the 160s. In 2003, the only other moulded bowl that must be presumed to be an Antonine CG product was found, again in a post-Roman context, and this too was probably made before *c* AD 180 (see Appendix 3, no 12).

Only one decorated fragment from the more recent excavations seems to have been made in East Gaul. Perhaps from an early workshop at Trier, if not Heiligenberg, the bowl was at any rate made in the earlier-2nd century (Cat no 60). Later EG products are absent, although in 2003 a late 2nd- or earlier 3rd-century EG bowl was recovered (Appendix 3, no 11).

A note on iconography

It has long been suspected that decorated samian ware was specifically chosen to reflect the character or purpose of a site. In Brougham Cemetery, Cumbria, three Doeccus bowls found as grave-goods displayed vegetal imagery: evergreens appeared symbolic of Life, while ivy apparently had funerary connotations and it occurs *en barbotine* on forms 35 and 36 – forms which are found commonly in cemeteries (Bird 2013, 336). Ivy also occurs on Curle 11, a flanged bowl found in abundance at this amphitheatre, and it recurred in the moulded decoration of at least one 'small bowl'. Comparing this assemblage with that from the neighbouring civilian settlement at Priory Place (Ward, M unpublished), more than three times as many ivy-adorned forms occurred. Where pots feature gods associated with the underworld or depict death rites, ritual connections are suggested when found in funerary contexts at sites including Brougham Cemetery, but also in ritual deposits (Cool 2004; Ward, forthcoming *c* and *d*; Bird 2013, 333–7). One might legitimately expect to find a large proportion of gladiatorial scenes on decorated bowls from an amphitheatre, especially if souvenirs were on sale.

From an analysis of Oswald's (1936–7) figure-types on samian ware in general, gladiators were slightly more popular than deities: Webster and Webster (2013, 344) observed that two pairs and a single gladiator and one *bestiarius* make 13 appearances between them. However, by far the most popular of the motifs relate to hunting either in the open or in the arena. It is not surprising that lions feature prominently in this Chester assemblage: big cats and especially lions are found ubiquitously on samian ware at British sites, whether arenas or not. In contrast, at Silchester amphitheatre, no gladiatorial types were found and none were published from Chichester or Caerleon. However, a large collection of vessels with gladiatorial decoration was present at London amphitheatre (Bird in

Bateman *et al* 2008, 135): 17 of the 324 mould-decorated vessels displayed 'arena scenes', giving the relatively large proportion of 5.2%. Some of these figure-types recur at Chester amphitheatre. Nonetheless, these recent excavations revealed a maximum of six such scenes (1.9% of 309 decorated bowls) and another included a charioteer: see Cat nos 23 (perhaps), 28, 32, 75, 111, 116, and 114. Even so, this was a slightly greater proportion than at other local sites. Only three vessels depicting arena-related types were identified at Priory Place (1.6% of 196 bowls retaining decoration; Ward, unpublished). Likewise, there are five examples of gladiatorial decoration from three excavations in the extra-mural industrial complex at Middlewich (Ward, M 2008a; 2009b; 2016); this is again a smaller proportion (1.4% of their decorated bowls) than at Chester amphitheatre.

Previously recovered from Chester amphitheatre and ascribed (probably) to the make-up for the seating bank was a bowl of form 37, with the same pair as on form Knorr 78 at London amphitheatre (with *retiarius* and gladiator, detailed by Bird 2008, 140 and 185, RP169). Those gladiatorial types on samian ware (Demarolle 2002, figs 1–2) which are represented in the recent Chester amphitheatre include *murillo*, *thraex*, *retiarius* and *secutor*, while others were probably *bestiarii* or *venatores*. Most of these bowls comprised mere fragments, and the real number of gladiatorial bowls represented by the surviving sherds may have been far greater. For instance, the predilection of one potter, Drusus i, for such subject-matter is well-known (Bird 2008, 140) and this amphitheatre was graced by at least one of his bowls (Cat no 77). In addition to the incontrovertibly gladiatorial depictions, charioteering was also shown (Cat no 114; see also Appendix 3, no 9 from 2003). Numerous wild beast or hunting scenes were also depicted, as were smaller hunting pairs such as dogs and hares (for proportions of all such animal scenes and arena-related types recorded by Oswald, see Webster and Webster 2013, 343). However, at Chester amphitheatre there is as yet no iconographic evidence for the bulls associated with *venatores* elsewhere (eg London amphitheatre: Bird 2012, *passim*; Ward, M 2016, 95). At London, other motifs relating to the arena and its rituals were discussed (Bird 2012, 141–4); the recent Chester amphitheatre finds did not display Hercules or indicate any arena re-enactments of the Herculean Labours (Bird 2013, 337; Ward, M 2016, 151), although Hercules with the Hydra was depicted on one previous find (Hartley and Morris, 204 no 12).

Apart from the suggestions that samian vessels at Chester amphitheatre could have been sold as souvenirs or used by spectators in eating and drinking, it is possible that some were employed in rituals, and indeed at ritual meals, associated with the Games. The assemblage includes single depictions of Bacchus and Venus, while the omnipotent Jupiter and militaristic Mars were recorded previously (Newstead and Droop 1932a, pl 8.11–12). There are several

examples of cupid (not merely associated with Love, as in the modern mind-set), including those on the miniature gladiatorial bowl, Cat no 75. Cupids were ubiquitous on samian ware (Webster and Webster 2013, 203) and they were associated iconographically with many subjects in Roman art and craft, as seen in the gladiatorial cupids at Bignor villa in Sussex and in Oswald's catalogue of samian figure-types (1936–7). The cupids on Chester's miniature vessel were set alongside gladiators and at least one dolphin; similarly, gladiators encountered a dolphin on a lost terracotta plaque from Colchester (decorated also with an ivy scroll; Webster 1989, 4; Wilmott 2008, 134). Again to the modern mind, dolphins appear to have little to do with gladiators, but they were associated in antiquity with death and regeneration en route to the Isles of the Blest (Toynbee 1973, 207–8). Funeral games are indeed considered to have been the precursor of the amphitheatre's gladiatorial combats (Hopkins 1983, 3–4). In line with Hopkins' expressed disquiet over the interpretation of specific customs and artefacts, Bird (2013, 326) stresses that, when considering decorated samian ware, we must 'remember that we are looking at the choices of individuals and trying to understand how they may have perceived the imagery on the pots, rather than analysing what the potters actually intended to depict'. It must also be noted that the degree to which the presence of specific figure-types may have had ritual significance requires more detailed statistical analysis than is feasible here (see Webster and Webster 2013, 340).

Nonetheless, Pan and the satyrs and fauns associated with Bacchic rites appear less common in the Chester amphitheatre assemblage than in London's (see, however, Chester's form Knorr 78: Newstead and Droop 1932a, pl 8.10). In contrast, Diana is seen more frequently, occurring on three bowls, as does Victory on at least two. Both types are common on SG samian ware (Webster and Webster 2013, 342), but at amphitheatres the personification of Victory was obviously pertinent to combat. Diana, too, was goddess of the hunt (Bird 2012, 141), and samian bowls depicting her may have been used in ritual contexts (Bird in Bateman *et al* 2008, 135). Bateman (2009, 158) has drawn attention to Tertullian's suggestion that Diana and Mars were the principal patrons of the amphitheatre, noting that altars to Diana occur at several European amphitheatres, with Diana 'venerated, through syncretic assimilation, with Nemesis'. Thus, Nemesis/Diana would become associated with amphitheatres in the minds of fighters, organisers, spectators or indeed all citizens. Although advanced statistical analysis would be required, the frequency of Diana and Victory on samian bowls at amphitheatres might support the epigraphic evidence relating to Diana and to Nemesis at amphitheatres including those in Chester, London and Caerleon. At Chester, apart from the large Nemeseum, a smaller shrine is suspected from these recent excavations, and a repaired pot would not be out-of-place in a votive setting, or indeed in the fighters' shrine (Bird

2008, 135). It is possible that Chester's numerous 'small bowls', ivy-adorned vessels and some of the unusual forms were used in arena rituals, whether in libations at shrines or as vessels at the *cena libera*, for which we have little firm evidence (Bird 2008, 135). The use of samian ware, whether in serving the 'free lunch' or in votive offerings, remains hypothetical.

Evidence of wear, repair, re-working and re-use

The greatest significance of samian ware found in an archaeological context resides in the information that it provides about the site and its occupation. Comparative evidence for the use, repair, reworking and reuse of samian ware contributes much to the growing body of information. There has long been awareness of its significance (Bulmer 1979/80, 89; Marsh 1981, 227) and it is important to publish data in full.

Approximately 6% of this collection shows evidence of primary wear or secondary use. There were 8 graffiti or intentional incisions, 3 vessels with drilled holes, 5 counters, roundels or discs and at least 10 examples of other refurbishment, whether reworked or reused. Details are provided in the Catalogue and are discussed below. Vessels showing evidence of use or refurbishment are listed per category in order of phase and production-date (not date of refurbishment). All illustrated vessels are noted as such.

The great majority of the samian vessels had seen little primary or secondary use. That no more than 6% show signs of wear and/or reworking is more obviously unusual when compared with other assemblages: *c* 11% at Priory Place (Ward, M unpublished) and 10% in the western *canabae* at Greyfriars Court (Ward, M 2012b, 68) – or indeed 16% in one large assemblage from the Middlewich industrial complex (Ward, M 2008a, 142). While such variations doubtless reflect the differing natures of site activity, the fragmentary condition of many amphitheatre 'vessels' must be borne in mind. Looking therefore at the surviving footrings alone, over half of the 87 footrings show little or no evidence of wear from use. In Period 3, 17 of 22 footrings were little if at all worn (*cf* Phase 5, Cat no 9; Phase 6, Cat nos 22, 29, 31). Of seven vessels surviving in complete or near-complete profile, two or three recovered from post-Roman contexts show evidence of wear (Cat nos 93–94 and 135), while four footrings show little, if any, wear (Cat nos 9, 29, 38 from Phases 5–7, and the miniature bowl, no 75).

The scarcity of evidence for wear incurred through primary use is clear and does not appear typical of large groups from sites under 'normal' occupation. Signs of simple wear presumably from primary use were almost all found on footrings, as opposed to basal interiors. Elsewhere, the basal interiors of vessels have commonly been worn through primary use (see Biddulph 2008; Ward, M 2008b and others). However, some of the amphitheatre vessels

Table 28 Samian ware displaying graffiti, in order of site-phase and production-date.

Area	Context	Cat. No	Phase	Fabric	Vessel type	Production date-range, c AD	Details of graffiti, etc
A	625	20	5	SG	dish	c 70–100	Owner's name abbreviated to initial letter: F, P or T
A	838	45	7	SG	dish	c 80–110	A short personal name ending in -us, here in the genitive case.
B	2136	133	post-Roman	SG	dish	c 55–75	[...]VI more likely than IM[...]
C	3030	134	post-Roman	SG	dish	c 70–100	S[...]
A	46	135	post-Roman	SG	dish	c 70–110	BL (Blaesus or Blandus?)
A	341	89	post-Roman	SG	cup	c 80–110	Probably part of a cross, 'X', if not A or V
B	2346	124	post-Roman	CG	bowl, dec	c 155–190	Perhaps part of a large cross, 'X'
A	333	136	post-Roman	CG	dish	c 165–200	An identification mark or initial Λ (rather than V) outside possibly an improvised abacus or gaming board (Figs 268–269).

especially from late contexts do show wear from primary use. There are three obvious exceptions to the little worn amphitheatre vessels: each heavily used and all in post-Roman contexts (Cat nos 83, 102, 105). One cup of SG form 27 was heavily scoured internally; a bowl of SG form 37 exhibits gouge-marks on its internal base, perhaps the result of chopping, while another SG bowl form 37 had a small patch of its internal surface purposely removed, but, since there is no trace of an erased graffiti, that purpose is unknown.

Evidence of 'literacy' and graffiti

Inkwells, like seal-boxes, are taken as evidence of literacy, although the latter appear to have a wider geographical and social distribution in Britain than do samian inkwells (Willis 2005b, 97 and 107). At Abbey Green in Chester's fortress, the 1970s' excavations revealed styli and seal-boxes, but only one or two samian inkwells amongst over 3,000 samian sherds which included numerous graffiti (Ward, report unpublished; see Bulmer 1980, 25; Ward, M 2011, 87). Similar distribution may be reflected amongst the present finds. No samian inkwells have been recognised at the amphitheatre (see Cat no 82). In the western *canabae* at Greyfriars Court, amongst only 221 samian vessels there were 4–5 inkwells (one possibly an unrecognised EG example: cf Ward, M 2012b, 67; fig III.2.34 no 60) but, as at the amphitheatre, there were no inkwells amongst 881 vessels from the neighbouring site of Priory Place (Ward, M

unpublished). However, at Caerleon amphitheatre there were three inkwells amongst 719 vessels, and at London one significantly stratified CG instance was said to be from the amphitheatre's rebuild, possibly indicating involvement from architects and the military (Monteil 2008, 181).

In most other respects, this samian assemblage is suggestive of a high-status site with military connections. Some graffiti provide evidence of literacy, although only at a basic level. Incised after firing, eight such incisions including graffiti are fragmentary (Table 28). They are discussed briefly here, but full details were provided by epigraphist Roger Tomlin and have been integrated into the catalogue.

The eight vessels displaying fragments of graffiti, marks of ownership or intentional incisions comprise 0.66% of the samian assemblage. This is lower than their proportion comprising 0.9% at Abbey Green within the fortress (Bulmer 1980), but it is close to 0.6% of the 881 vessels excavated nearby at Priory Place (Ward, unpublished). Comparison with data published in others' reports is difficult when graffiti on differing materials are analysed together, but evidence from other northern sites is available: their proportion overall was 0.5% at Piercebridge, 0.86% within Ribchester's *vicus*, and 1.25% at the Carlisle fort Millennium excavation (see Ward, M 2008b; Dickinson 2000; Ward, M 2009a). At Middlewich's extra-mural and probably military-related industrial complex, proportions vary across sites from zero and 0.16% to 0.93% (perhaps relating to the specialised, industrial functions of each area).

Of the eight graffiti under discussion, two were found in Amphitheatre 1 contexts (Phase 5, Cat no 20 and Phase 7, Cat no 45) and the remainder were in post-Roman contexts. The majority are dishes. With the exception of one SG cup form 27 g (Cat no 89), all of the SG instances including the two from amphitheatre phases, are dishes, and all of the graffiti on dishes appear representative of the owners' name (eg Cat no 135). Of the two (Antonine) CG vessels, one was a moulded bowl (Cat no 124). At both forts and vici, it is normal to find the great majority of graffiti on bowls (Evans 1987, 198 fig 6). Thus, the large proportion of marked dishes amongst so many (unmarked) bowls at the amphitheatre is abnormal. So, too, graffiti on beakers are commonly found at both forts and vici, but, despite the amphitheatre's unusually large proportion of enclosed vessels, graffiti are absent from them. This may appear surprising; however, no footrings were recovered amongst the amphitheatre beakers and this perhaps explains the absence of (usually basal) graffiti.

No nicked or notched footrings were found during these particular excavations (or indeed at Middlewich; Ward, M 2008a, 2009b; 2016), although others may have gone unrecorded previously at the amphitheatre. At least one was found at Priory Place (Ward, M unpublished). However, the scoring of two bases found at the amphitheatre may be taken as marks of ownership (Cat nos 89 and 124). Neither of these practices would require literacy, or indeed numeracy. These recent amphitheatre finds supplement the previous evidence of 6–7 graffiti: one mark of ownership ('X') was incised under the base of dish form 18 (stamped by Vitalis ii: Appendix 2; Newstead and Droop 1932a, 25), as was an owner's name under the base of form 29 (note by Newstead and Droop revised by R P Wright in Thompson 1976, 187). From the 1960s' excavation, 4–5 samian vessels displayed graffiti: 2–3 cups and two dishes (Thompson 1976, 185–87; Hartley and Morris 1976, 204–207). Two cups were certainly inscribed, one under the base stamped by Firmo i (AD 60–85: Appendix 2) and the other on the

lower wall (for both, see Thompson 1976, 186, 207 fig 34.6 and 187, fig 22.10). No graffiti were recorded in the excavations of 2000–2003.

Proportions of samian vessels with graffiti vary from excavation to excavation. Furthermore, although the total proportion of the graffiti found in the amphitheatre excavations is relatively low (0.66% of 1208 vessels), this should not necessarily be taken as representative of literacy levels as a whole (Evans, 1987 196–197). Two of the few Antonine products (Cat nos 124, 136) retain graffiti: one displays externally a mark of ownership in addition to internal incisions which are discussed below as possible indications of a makeshift abacus or perhaps a gaming board (Cat no 136, Figs 268, 269). The fact that two of the eight instances are late 2nd-century products (and possibly the latest of the Antonine vessels) is not necessarily significant in terms of contemporary literacy; the sample displaying graffiti is small. Evans (1987, 202) long ago called for the date of vessels exhibiting graffiti to be included alongside site-contexts in their descriptions. He noted that 'there is no evidence of a later decline of literacy, or of an Antonine peak, as seen in the Egyptian papyri' and suggested that the pattern may vary between provinces. However, it has been drawn to our attention by Egyptian papyrologists that, apart from sharp peaks, there seem to be long-term evolutions including an 'impressive rise in the 1st and particularly 2nd century AD' (Van Beek and Depauw 2013, 102). Papyrologist Dorothy J Thompson comments that for the 2nd century AD peak, this probably reflects the survival of particular rubbish heaps, especially those of Oxyrhynchus excavated by Grenfell and Hunt in 1896–1907 (Parsons 2007) which are far the greatest single source of Roman period papyri; the chance of discovery can change the picture dramatically and tells us little about literacy rates. Thus, the random survival of two late 2nd-century products in a small sample of graffiti-bearing vessels at the amphitheatre should not be taken as chronologically significant in terms of literacy.

Table 29 Samian ware displaying repair-work or other intentional holes.

Area	Context	Catalogue No	Phase	Fabric	Vessel type	Production date-range, c AD	Repair-work, etc
B	2607	57	10	SG	bowl, dec	c 70–85	Broken at a large hole, 7 mm across, below the decoration. Foot smoothed.
A	411	76	11b	CG	bowl, dec	c 100–125	Broken at a rivet-hole through the decoration: part of the hole is visible, probably the round, drilled type and retaining traces of lead. Badly burnt.
B	2353	125	post-Roman	CG	bowl, dec	c 160–190	Broken at a large hole through the decoration, 9 mm across, showing evidence of further smoothing. There is also possible evidence of re-working at the sherd's edge.

Pierced and/or repaired samian ware

Three moulded bowls, found in post-Roman contexts, have round holes through them (Cat nos 57, 76, 125; Table 29), of which Cat no 76 certainly exhibits repair-work. In Phase 6, another bowl shows unusual tooling on the footring which is unexplained; if (though unlikely) this were repairwork, it would have been unsuccessful (Cat no 37). Both Cat nos 57 and 125 display further tooling in addition to their 'holing'.

Thus, the proportion of repaired samian for this site was 0.08% or 0.25% (excluding Cat no 37). Such proportions are exceptionally small when compared with apparently military-related assemblages analysed under similar methodology: 0.3% in Carlisle fort; 0.7% at Prestatyn; 1.4% at Piercebridge, overall (3% in the 'vicus north'); 1.6% in Lancaster vicus; up to 3% at extra-mural Middlewich; 5% at Stockton Heath, Wilderspool (details respectively in Ward, M 2009a, 564; 1989, 154; 2008b, 193; forthcoming b; 2008a, 146, cf 2009b and 2016, 92; 2012, 24–5). Willis (2005a, 11.5 table 73) found the average for repaired samian in groups from nine military sites to be 2%, which was also the proportion of 881 vessels found at the amphitheatre's neighbouring site (Priory Place 1989; Ward, M unpublished).

It is always difficult to judge the success of repair-work seen on samian ware, especially when no sign of the metal work has been preserved. However, in the case of Cat no 76 (a probably Trajanic bowl), the small fragment of hole, of the round, drilled type, appears to show traces of lead, and this may imply a successful repair. Another repaired bowl, of SG form 37, was discovered at the amphitheatre in the 1960s, displaying an ovolo allegedly similar to one at Holt resembling those common at sites under Domitianic and later occupation (RGZM ovolo 00035 or related; when accessed 17/2/2017). This bowl is described as 'riveted' (Hartley and Morris, 1976, 204 no 12); if accurately worded, the presence of a rivet would suggest successful repair. Another, but unpublished, SG vessel of indeterminate form was found during the 2002 excavations in a post-amphitheatre context: here, traces of lead are again visible in a round rivet-hole of the drilled variety (see Appendix 3 no 7). Noted above was Bird's suggestion that a repaired pot would not be out of place in a votive setting or in the fighters' shrine: indeed, two of London amphitheatre's gladiatorial bowls were repaired, using the H-shaped and (probably) the swallow-tailed variety (Bird in Bateman *et al* 2008, 186–87).

Of Chester amphitheatre's three items displaying large holes, the early-Flavian SG bowl was drilled through the lower wall, and the later-Antonine bowl, of CG form 37, was drilled through the base outside and above the footring. However, at diameters *c* 7 and 9 mm, these holes appear larger than the normal, drilled rivet-hole. Another vessel with a standard rivet-hole was excavated in 2002, but a third example of the larger-sized hole was found in 2001 (see Appendix 3, nos 7 and 5). This last was a dish of form 15/17, stamped by a potter active AD 65–110 and

probably produced by *c* AD 85; its round hole was again of diameter 7–8 mm, drilled through the base outside and above the footring: see Cat no 45 (i). All three vessels with these abnormally large holes have broken through the profile of the base, with the holes apparently drilled from the outside inwards; each had finally broken through the worked hole at an acute angle leaving more of one surface intact than the other. Another large-sized hole of similar appearance is evident, though not mentioned in the report, on a moulded bowl found unstratified at Caerleon amphitheatre (Wheeler and Wheeler 1928, pl 35.1 no 7). Peter Webster (pers comm) confirms its hole to have been of diameter 7 mm. The absence of metal-traces in these holes as well as their large size would support the suggestion that their drilling was not done as repair-work unless the use of laces is considered feasible (Peña 2007, 245). These vessels, however, had presumably seen use. The footring of the dish, Cat no 45 (i), was worn from use, and it is conceivable that the purpose of its piercing may have been to lift this shallow vessel by cords, perhaps inverting it for use as a lid. Further tooling is apparent on the two other instances. The footring of one bowl (Cat no 57) had had its standing surface smoothed, while the latest of the unusually 'holed' pieces (Cat no 125) displays a drilled hole which itself was 'smoothed'. The latter's smoothing might corroborate a suggestion that these large holes were drilled in order to lift – or indeed to hang – the vessels (cf Peña 2007, 236). Its smoothing might have prevented excessive rubbing against a cord.

Occasional sculptures depict vessels hanging up, but mostly from their handles: Peter Webster (pers comm) points out that a tombstone from Til-Châtel portrays a shop-keeper with jugs hanging around him (Esperandieu 1911, vol 4, 442–3, no 3608). Another, from Saint-Ambroix-sur-Arnon (Ernodurum), displays hanging pots, probably flagons (Esperandieu 1925, vol 9, 245–6, no 7008). Depiction of a wine-shop with such pots was apparently found in 1982 during work on St Maximin, Trier (*Rheinisches Landesmuseum Trier* 1984, 237–8, item 124). Handled samian vessels, whether flagons or beakers, are rare (see discussion of *lagenae* above) and if samian ware was indeed hung at the amphitheatre, these particular, unhandled vessels would need stringing up. However, the material remains of these (pierced) Chester and Caerleon vessels are small and so, even in the case of Chester's more substantive 2001 find, Cat no 45 (i), it is impossible to say how many, or rather, how few, holes there were originally and what their purpose was (for suggestions, see Fulford and Timby 2001, 295–96). Certainly, the Roman practice of perforating a pot by boring a hole was mentioned in the 1st century AD, albeit with reference to 'how to make curds': Columella, *De re rustica* 12.8.1. Nonetheless, similar technique will have been used for other purposes, whether food- and ritual-related, or for suspending vessels. These particular Chester vessels had production-dates varying from *c* AD 65/70–85 to *c* AD 160–190 and may well

represent different phases of activity: whilst the (probably Flavian) dish was excavated in the equivalent of Phase 7 during 2001, the two bowls were found in Phases 10 and 15 and thus could represent some unknown activity or function of later date.

Roundels including counters and their use

Five items had been reworked as roundels (Table 30; Fig 313), four apparently counters and one larger disc (Cat nos 36, 140–143). This last (Cat no 143) was made from a CG vessel of Antonine date, roughly hewn, large, and seemingly unfinished for whatever function it was intended to serve. The four small counters were of similar diameter (*c* 13–16 mm). Only Cat no 36 was found in an Amphitheatre 1 context (Phase 6, Area B), from the seating bank. The remaining four items were from post-Roman contexts, three in Area C and one in Area A's context (1). While no samian counters were recorded by either Newstead and Droop (1932a) or Hartley and Morris (1976), one of very small size, diameter 9–11 mm, was excavated in 2000 (Appendix 3, no 1). All these counters are plano-convex, though not all are now complete and one was flattened. Comparable are 50 glass counters found in the recent excavations; all are of similar diameter to the samian examples, with 47 recovered from the seating bank in Area B, Phase 6. Two of these were found in the same context (2612) as Cat no 36, a samian counter accompanied by 34 other samian sherds including a beaker and a bowl with gladiatorial decoration (Cat nos 34 and 32).

Counters (*calculi*) were used in games and it is possible that a samian dish or platter with an unusually incised base found in Area A (Cat no 136) served a secondary function as a gaming board, imitating the formal type depicted by

a samian potter (Osw 987). Several slabs incised for the game of *latrunculi* are known at British sites including Hadrian's Wall (Schädler 1994, 50–51, 53). However, the use of *calculi* is also attested in counting and accounting: this seems hinted at in the love poetry of Catullus (5; see Levy 1941, 223–4), and Pliny the Younger (*Ep.* 6.33.9) referred to such use of *calculos tabulamque* (counters and a board). With its very precise ruling, the amphitheatre vessel may have been reused as an improvised calculating table (Tomlin 2014, 438–39). Such an abacus would have consisted of two rows of parallel columns, up and down which counters were moved: its use appears in sculpted relief from Trier (Schärlig 2006, 72), and small examples in bronze survive in Rome and Paris (Kretzschmer and Heinsius 1951). The amphitheatre vessel was a large, heavy and flat-bottomed dish or platter of form Walters 79 or 79R, a later-Antonine type, of which the surviving piece was unusually and very badly burnt. Roger Tomlin (p 275) adds that the basal interior with its incised parallel columns would provide adequately for a make-shift abacus, or indeed an improvised gaming board. If the latter, it would have been similar to a backgammon board (as used in *Duodecim Scripta*). Such use might seem inherently more likely at an amphitheatre: games were certainly played on the theatre steps at Palmyra (de Voogt 2010, 1060, fig 4). If it were a calculating table, however, this might exemplify Pliny's description of *calculos tabulamque*, and taking the Roman equivalent of a pocket calculator to the Games is quite feasible. Its capacity would have been great and it could have served many uses, whether for keeping a personal tally of combats, making bets or adding up receipts on a large scale. The importance of betting at the races is clear (Ovid, *Ars am.* 1.167–8); it was emphasised by a satirist who was contemporary with activity in this amphitheatre

Table 30 Samian roundels: counters and disc (see Fig 313).

Area	Context	Cat No	Phase	Fabric	Vessel type	Production date-range, <i>c</i> AD	Details	Diameter
B	2612	36	6	SG	cup or dish	<i>c</i> 70–110	A counter, reworked from a sherd at the wall/base junction	15 mm
C	3084	142	Post-Roman	SG	ind	<i>c</i> 70–110	Presumed attempt at a rough counter, but incomplete; <i>c</i> 5 mm thick.	15–16 mm
C	3066	140	Post-Roman	SG	dish	<i>c</i> 70–100	A neatly rounded counter. External surface removed and levelled; wall/base junction perhaps flattened down. Now only <i>c</i> 2 mm thick.	15 mm
C	3059	141	Post-Roman	SG	ind	<i>c</i> 70–100	A neatly rounded counter; <i>c</i> 4 mm thick.	13 mm
A	1	143	Post-Roman	CG	dish	<i>c</i> 140–200	Disc, apparently unfinished, but broken; <i>c</i> 9 mm thick	<i>c</i> 35 mm

Table 31 Other re-worked or re-used samian vessels.

Area	Context	Cat No	Phase	Fabric	Form	Vessel type	Production date-range, c AD	Details
A	1152	14	5	SG	37	bowl, dec	c 80–100	Rim smoothed down by owner?
B	2500	37	6	SG	37	bowl, dec	c 70/80–100	Foot partly smoothed for stability, with further tooling after it was smoothed (see comments).
B	2607	57	10	SG	37	bowl, dec	c 70–85	Foot partly smoothed for stability; see also drilled hole.
A	485	63	11a	SG	37	bowl, dec	c 70–100	Foot smoothed.
A	244	62	11a	SG	27g	cup	c 70–110	Foot smoothed, but hacked off roughly, perhaps for inverted use.
A	139	137	post-Roman	SG	27g	cup	c 70–100	Cut down to the foot, with the basal interior filed flat. Function unclear; re-used as a stand or, inverted, as a miniature receptacle
A	1	139	post-Roman	SG	27	cup	c 70–110	Filed down at the curvature.
A	412	138	u/s	SG	27	cup	c 70–100	Cut down, roughly, at curvature.
B	2353	125	post-Roman	CG	37	bowl, dec	c 160–190	The wall appears filed down, at least partially; see also drilled hole.
A	333	136	post-Roman	CG	79 or 79R	dish	c 160/5–200	The internal incisions suggest an improvised abacus or gaming board (Figs 268–269). See also external graffito.

(Juvenal, *Sat.* 11.197 and 11.201–2) and there has long been conjecture of gambling at amphitheatres (Hopkins 1983, 26). However, until a makeshift abacus is found in a better state of preservation (Schärlig 2006, 79), the identity of the Chester item remains speculative.

Other re-worked or re-used samian ware

In regard to the assemblage as a whole, the vessels show surprisingly little use, whether primary or secondary. Repaired or refurbished vessels would not be out of place in a ‘ritual’ context (Bird 2008, 135; Cool and Leary 2012, 315) but, as noted above, very few samian vessels from Chester amphitheatre had been repaired. On the other hand, several vessels were tooled in unusual ways, displaying a broad spectrum of re-working processes (*cf* Peña 2007, 196–98, 204–05, 250–52). Another unusual feature is that some of these processes might have rendered several vessels unusable for certain functions. For instance, large basal holes and rims cut down to strange angles are not conducive to holding liquids; on the other hand, such holes (if not for the purpose of hanging up or lifting as a lid) would allow for the pouring off of liquid, whether for culinary, horticultural, timing or ritual purposes specific to the locality (Fulford and Timby 2001).

Amongst items providing evidence of secondary working or re-working (Table 31), an interesting feature on several footrings from this site is that they have been carefully smoothed down. This was apparently done to correct an unbalanced or wobbly vessel. Were they factory ‘seconds’? Of these vessels, Cat no 37 came from Phase 6, whilst Cat nos 57, 63 and 72 are from the Post-Roman Phases. Other vessels show different signs of refurbishment. Two SG cups of form 27 have been cut down at the curvature. A third has been reworked so significantly that it could have been used as a stand or inverted, with its footing becoming a tiny vessel or container.

Concerning the ‘holed’ vessels, Cat no 57 had its foot smoothed, but was pierced with a large hole when deposited in Phase 10, while Cat no 125, in a later post-Roman context, shows evidence of rough re-working, perhaps after (rather than before) it too was ‘holed’ and its hole smoothed. Whenever the final reworking took place and whatever its purpose, it remains possible that these ‘holed’ samian vessels had been on, or were intended for display at vendors’ booths, hanging on cords. Regarding the large quantity of refurbished samian vessels at Piercebridge (Ward, M 2008b, 189–93), it was suggested that a workshop associated with the metal-working activity in the ‘northern

vicus’ was perhaps responsible for refurbishment, including repairs, counters and filed-down items. At the amphitheatre, if numerous re-worked items were not brought in merely for use in its activities and rituals, we might speculate that the refurbishment of samian ware was offered as a service at one of its booths, perhaps with ‘holed’ vessels hanging up on display.

We can, at least, be sure that samian ware was valued. Samian items from any given site, when purposely cut down, filed, or smoothed off, represent reuse after (presumably accidental) breakage of vessels, thus giving them extended life. There are examples of vessels which were cut down and then perhaps re-used upside down (eg Cat no 137, an extremely small cup). Both types of refurbishment were recorded at the neighbouring Priory Place site (Ward, unpublished) and a cut-down vessel there revealed evidence of its function, retaining white accretion which had accumulated under the inverted base. Though this amphitheatre assemblage provides considerable evidence of reworking, few bases showed internal scouring from primary use. For instance, the popular flanged bowl, form 38 is notably scarce, if not absent: typical of Antonine activity, its basal interior is commonly found to have been scoured from some specific use. On a site under domestic occupation, more cups and dishes would have been expected to show signs of use (Dannell 2006; Biddulph 2008; 2008a, 144 and 2008b, 189). Chester’s amphitheatre, however, was a site with abnormal activity and one whose stratigraphy was peculiarly truncated. Such factors may serve to explain the shortage of vessels from the later 2nd century. Absent from the amphitheatre (but present at Priory Place; Ward, unpublished) are the so-called ‘spinning-tops’, common at northern sites (eg Ward, M 2008b, 192); made almost exclusively from late dishes, their absence probably reflects the scarcity of both dishes and late 2nd-century material.

Similarly, no spindle-whorls have been recorded from Chester amphitheatre, while one was present in the neighbouring *canabae* (Priory Place; Ward, unpublished). Their absence may be significant, though unsurprising, from an amphitheatre at the height of Empire, for spindle-whorls are thought diagnostic of late-Roman use (Cool 2000, 53) and perhaps of more domestic activity.

Chronology

A chronological overview of the samian assemblage is given below and the assemblage is summarised graphically in Figs 232 and 233, representing all vessels (excluding scraps) and all stamped and/or decorated vessels, respectively. Caution is, however, needed in interpreting such graphs which ostensibly represent the overall pattern of samian on an individual site. At this amphitheatre, it may be concluded that the relative scarcity of 2nd-century material is due to the fact that the most of the finds derived from construction dumps and amphitheatre use in the Flavian period. Most of

the vessels found residually in post-Roman contexts may be presumed to represent disturbance of material from the amphitheatre phases.

The most striking chronological feature of the assemblage was the predominance of SG products which were dated from the pre-Flavian to the Trajanic periods (86% of the total, using maximum vessel numbers). The proportion of CG vessels, being here 2nd-century products, was abnormally small (13%). Even in Saxon and post-Roman contexts throughout Phases 10–21, these vessels comprised no more than 18%. Only four vessels originated in East Gaul, comprising 0.3% of the total and 0.5% of vessels in post-Roman contexts: none was necessarily made later than the early- to mid-Antonine period.

On the histograms (including Figs 232, 233), little significance should be placed on minor fluctuations in the distribution of CG material (Ward, M 2011, 77). The salient factor is the lack of material dated within the Antonine period: compare Figs 232, 233 with Figs 234, 235, which represent samian vessels from various Chester sites both inside and outside the fortress (*cf* Ward M 2011, 89, figs 28–30 and 31–33 respectively).

Analysis of the plain samian forms revealed few pre-Flavian products. Most of the SG vessels were produced in the Flavian period and largely *c* AD 80–100. Amongst the earliest was one stamped by a potter active in the range AD 30–80; the cup was probably made *c* AD 45/50–70 and was most likely a Neronian product (Cat no 51, in Phase 10). Of 31 SG stamps recorded in Appendix 2 from all excavations at the amphitheatre, 18 were by potters whose activity began in the pre-Flavian period, but 12 were by potters who worked longer into the Flavian period, including two stamps (found in Phases 3 and 5 during the most recent excavations) dated within the range AD 65–90/95. Nonetheless, we must guard against circular reasoning: although Chester fortress is regarded as a Flavian foundation, this does not preclude some stamps from being pre-Flavian products. Even so, comparing the stamp evidence with that of the decorated bowls, we can presume that the great majority was produced in the Flavian period.

The large quantity of Domitianic material is evident amongst these moulded bowls, particularly of form 37. The chronological significance of the relative proportions of forms 29 and 37 is discussed above and in the phase summaries below. All the samples from Phases 3 and 4 are far from being statistically meaningful, but in Phase 5, forms 29 and 37 occurred in the ratio 7:17, while in Phase 6, certainly identified fragments of form 29 were overwhelmed in a ratio close to 1:10. This suggests that the material accumulated some years after AD 85/90. Amongst the potters’ stamps, one that was dated after AD 85 was found in Phase 5 (Cat no 8, AD 85–105). The latest SG stamp was probably that found in Phase 10 (Cat no 52), representing a die recorded previously on a similar form at the amphitheatre: it was made by a potter whose activity at La Graufesenque is dated AD 90–120. La Graufesenque’s

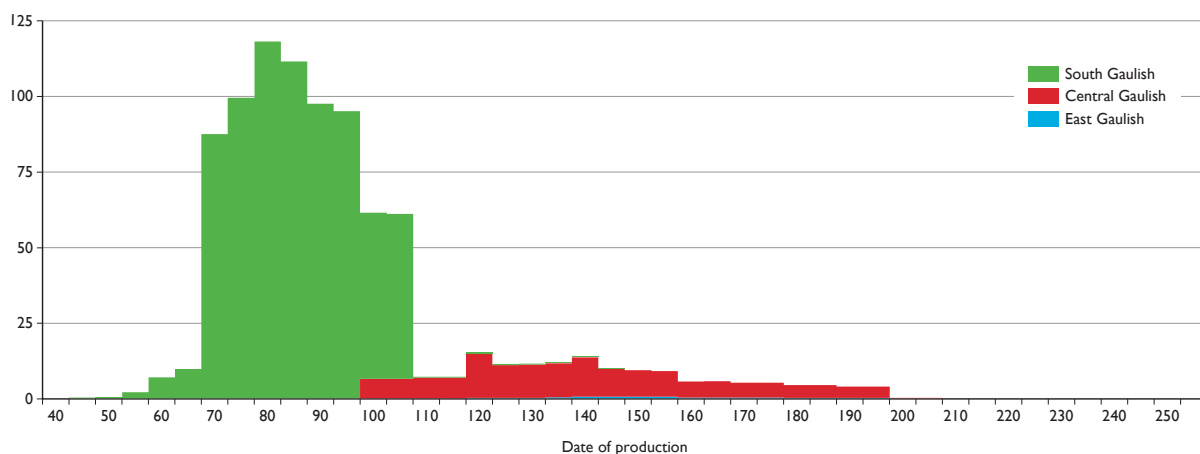


Fig 232 Histogram of all samian vessels by half decade (894, maximum nos, excluding scraps).

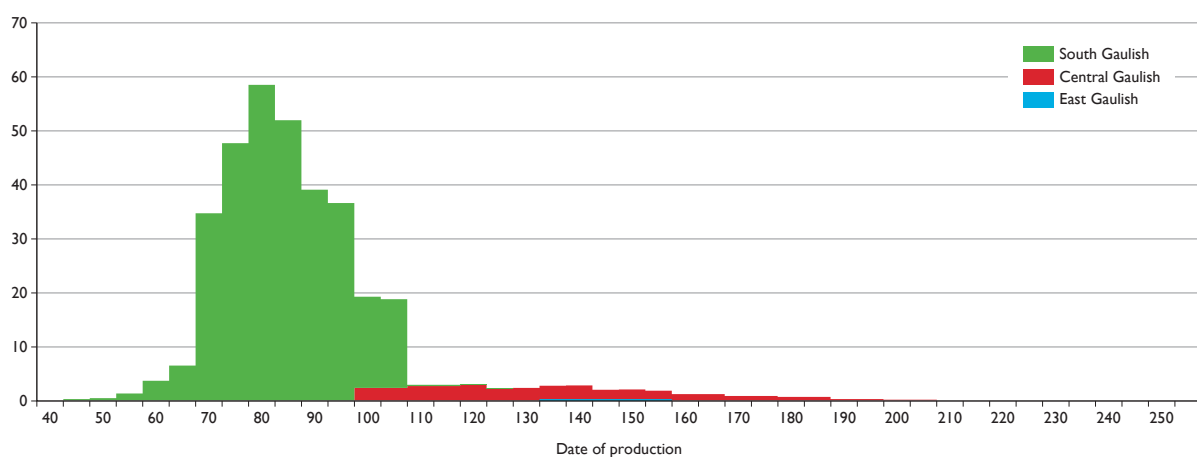


Fig 233 Histogram of stamped and/or decorated vessels by half decade (343, maximum nos).

exports to Britain are generally considered to have ended by *c* AD 110 but, in relation to the Upper German Limes, this is a subject of on-going debate (see Frere, Hartley and Dickinson in *NoTS* 2008, vol 1, 6–7).

Thereafter, the samian finds from this site do not follow the norm for Chester (Bulmer 1979/80, 56, fig 3; Ward, M 2011, 87–90). The proportions of exclusively 2nd-century wares found in Areas A, B and C were 7%, 11% and 44% of their samian finds, respectively. Whilst as much as 21% of the 2nd-century CG products were made at Les Martres-de-Veyre, mostly in the Trajanic period, some of these vessels will have been produced in the early-Hadrianic period.

Many (fragmentary) vessels were datable only broadly within the Hadrianic-Antonine period: in general terms *c* AD 120–190/200. A very few, perhaps six, were Hadrianic products from Lezoux and possibly Montans, while 38 vessels were probably Antonine products. While numismatic evidence for the Antonine period is, remarkably, absent from the amphitheatre, it should be noted that its samian evidence for Antonine activity is far less abundant than elsewhere in Chester (Figs 233–236; *cf*

Ward, M 2011, 89 and Ward, M 2012b, *passim*). Only 17 vessels appear to have been produced after *c* AD 145/150, only 5–6 of them probably after 160. Of the 17 vessels, 5 were recovered from Area A, 4 from B and 8 from C, and Area C indeed provides us with much greater evidence for later 2nd-century activity than do the other areas of recent excavation: in Area C, at least 15 of 165 CG vessels were Antonine products, while another 43 were dated broadly within the Hadrianic-Antonine period.

The relative scarcity of dishes at the amphitheatre includes a marked shortfall in quantities of the developed deep dish form 31R (ubiquitous on sites under steady occupation in the later-Antonine period). However, and significantly, more than half of the amphitheatre's later CG vessels were dishes (including the re-used specimen of form 79/R, Cat no 136), whereas only four of the numerous moulded bowls were dated specifically after AD 150. These bowls were found in post-Roman contexts: Cat nos 59, 124, 125 and, from Area C Phase 12 (3081), a burnt fragment of Cinnamus' standard ovolo B143. It is particularly striking that the proportion of dishes rose closer to a 'normal' level

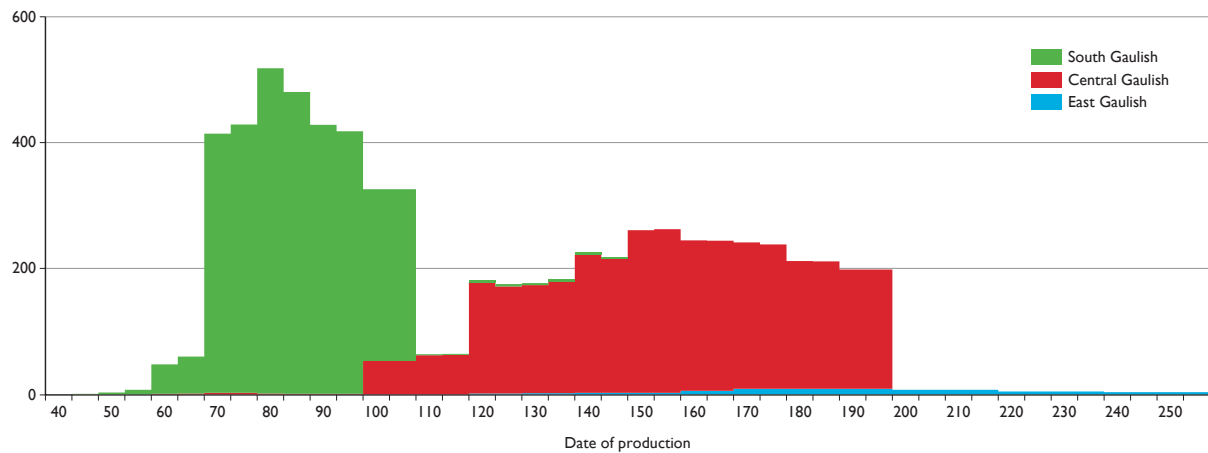


Fig 234 Chester fortress and *canabae*: total 7,106, maximum nos (see Ward 2011, fig 25).

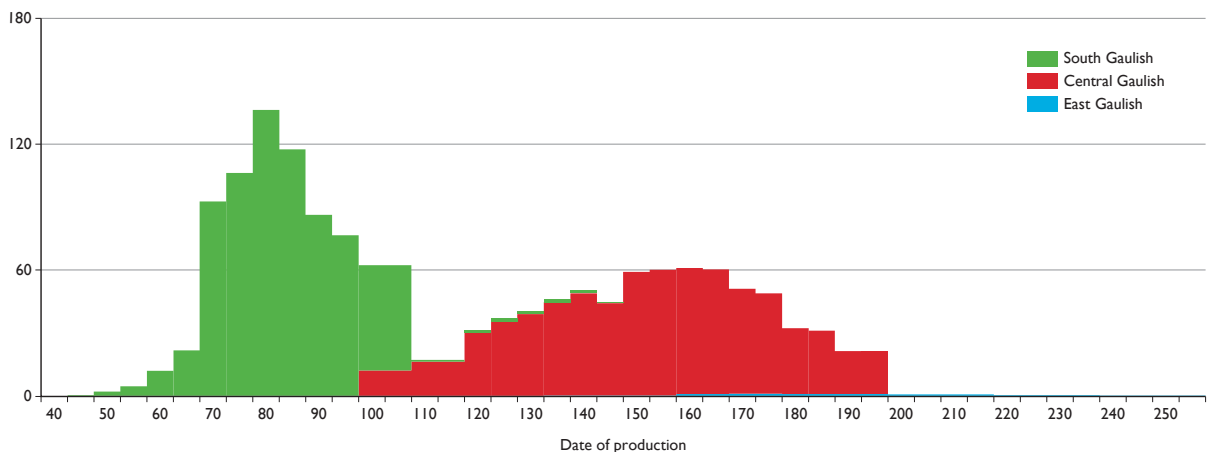


Fig 235 Chester fortress and *canabae*, stamped and/ or decorated vessels: total 1515, maximum nos (see Ward 2011, fig 27).

(Willis 2005, table 45) from post-Roman Phases 11 and 12 onwards. Interestingly, in Area C, the dishes comprised as much as 31% of its identifiable vessel types – and only in Area C did the CG products constitute a markedly larger proportion of the samian ware. Elsewhere in Chester, many more later-2nd century products would have been expected; here there was only one Antonine bowl (No 59) recovered from the amphitheatre’s ‘abandonment’ or changes of use.

The samian ware listed in previous publications was overwhelmingly early: only one vessel of later date (*c.* AD 125–150?) appears to have been published by Thompson (1976, 206, no 90). We might presume, therefore, that there was previously little samian evidence for Antonine activity, there being no specifically Antonine stamps and no decorated CG bowls amongst the published material. However, it is unclear how far publication was selective. Certainly, the less well-stratified finds from earlier excavations were not published and we know that some samian ware was lost (Thompson 1976, 200). Newstead and Droop (1932a) mentioned in their stratigraphic report some SG samian ware which is absent from the samian

catalogue, and it is likely that any (later) CG vessels were omitted from all earlier reports on the basis of their presumed irrelevance to the amphitheatre, if, as in the present excavation, most of this material was from later, residual contexts.

At any rate, it seems that any finds of Antonine date were few. Amongst 241 samian vessels from the unpublished 2000–2003 excavations (Appendix 3), only four vessels were dated specifically within the Antonine period. Found in 2003, one moulded bowl had probably been made at Rheinzabern in the late-2nd or earlier-3rd century (Appendix 3 no 11), and there were no late EG products from the more recent excavations. Similarly, there were no samian mortaria, a type not produced before *c.* AD 170 at the earliest, and whose presence is usually a good indicator of late-Antonine and 3rd-century activity (Ward, M 2008b, 178; Ward, M 2011, 82, 105 note 5; Ward, forthcoming a). Nor were there any samian spindle-whorls, finds which are considered diagnostic of late-Roman use (Cool 2000, 53); however, their absence may also reflect the nature of site occupation. At any rate, there being no mortaria, no late

EG products, and no spindle-whorls, this collection offers little evidence for late-Roman activity. This is consistent with the structural evidence.

Phase summary and samian ware catalogue

The Catalogue includes those 25 potters' stamps of which lettering survives. Of 316 vessels retaining any decoration, 76 were selected along with all beakers and some vessels which lack stamps or decoration, constituting 143 items presented in the Catalogue for their significance to the site and/or their intrinsic interest. They are listed in order of Phase, with products of South Gaul (SG) preceding Central and East Gaulish products (CG and EG). Vessels are catalogued in approximately chronological order by form. Also listed are those items which display graffiti (Table 28), evidence of unusual wear from use, repair, re-working and/or re-use (Table 29–31), followed by the vessel's production date.

Phase 0: Natural geology and soils

1 SG dish, form 15/17 or 18. Basal flake; weight 1 g.

A (1087); Phase 0. A Neronian-Flavian product. (Intrusive in context).

Period 2: Roman occupation before the amphitheatre Phase 3

The 12 samian vessels allocated to Phase 3 (Tables 32–34, Figs 236, 237) were represented by mere fragments with production-dates most probably within the late-Neronian to Flavian period. The *TPQ* of AD 71 provided by the Vespaianic coin CO21, found in sand deposit (1086), is supported by the evidence of two samian vessels produced in the general range *c* AD 60–85 and which were most probably later-Neronian or Vespaianic products. One stamp in context (1123) represented a potter who was active in the range AD 65–90 and the dish itself appears to be a late-Neronian or early-Flavian product (Cat no 2). It was probably contemporary with the Pompeian Red Ware in this context (p 285: Peacock 1977, 154, 159, PR3). One of six scraps in (1126) was dated *c* AD 70–110, but weighed <1 g: it may well have been a Flavian product. One moulded bowl was of form 29, while form 37 was not represented; for significance, see the discussion of

Table 32 Summary of samian ware in Phase 3.

Phase	Sherds	Vessels (max nos)	EVEs (rim)	Weight	Average sherd-weight	No of sherds <1 g
3	12	12	0.02	25 g	1.9 g	6

Table 33 Samian forms in Phase 3 (maximum nos of vessels).

Form	SG	CG	EG	Total
15/17 or 18	3			3
18R	1			1
27	1			1
29	1			1
30	1			1
ind	5			5
Total	12	-	-	12

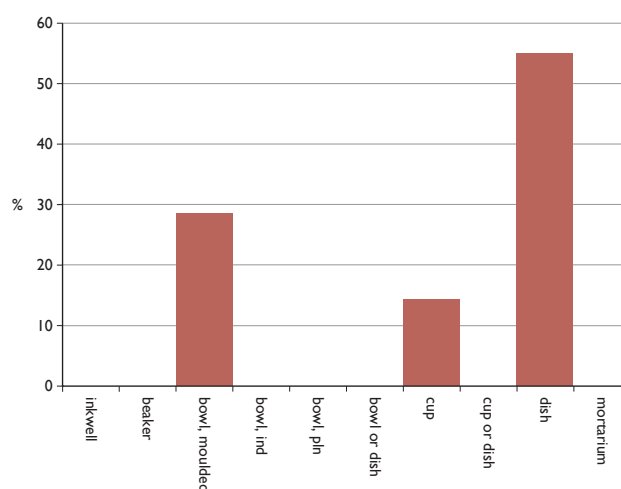


Fig 236 Proportions of vessel types in Phase 3 (7 vessels, excluding indeterminate types).

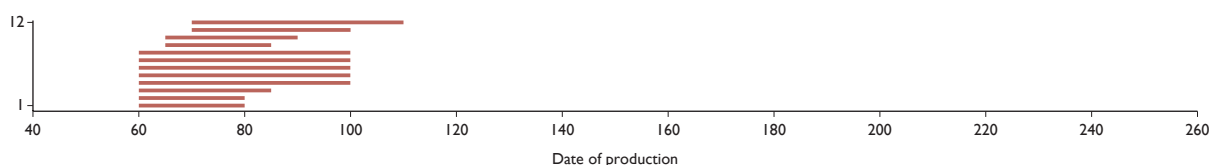


Fig 237 Floating bar diagram showing date-ranges of vessels in Phase 3 (maximum nos of vessels: 12).

Table 34 Vessel types in Phase 3 (12 vessels, maximum nos).

Phase	Dish	cup	cup or dish	bowl or dish	bowl, plain	bowl, ind	bowl, moulded	ind, moulded	beaker	handled vessel	ind	Total
3	4	1					2				5	12

Table 35 Summary of all samian ware in Period 3 Phases 4–7.

Phases	Sherds	Vessels (max nos)	EVEs (rim)	Weight	Average sherd-weight	Sherds <1 g
4–7	388	323	3.51	1453 g	3.7 g	178

form-types, but note that the sample from Phase 3 is far too small to be statistically meaningful.

Stamped ware

- 2 SG dish, form 15/17 or 18. The fragment of stamp appears to represent [Q·IVL·HA]BI and thus Q. Iulius Habilis or Habitus; see *NoTS* 2009, vol 4, 347. This would be die 1a, as previously noted on dishes at various northern sites, including Chester's civil settlement. Form 18 was excavated in 1936 on Foregate Street (Newstead 1939, 75 and pl 21, no 20). This potter worked at La Graufesenque in the range AD 65–90 and the amphitheatre dish appears to have been a late-Neronian or early-Flavian product. Two fragments, weighing 5 g. A (1123): Phase 3 layer (cultivation soil of Phase 2, but disturbed in Phase 3); SF 9867. *c* AD 65–80/85?

Selected moulded bowls

- 3 SG form 29. A decorated chip weighing <1 g. A (1273). Later-Neronian or Vespasianic.
- 4 SG form 30; rim fragment, weighing 1 g. A (1086). Later-Neronian or Vespasianic.

Period 3: The First Roman amphitheatre

Proportions of samian ware in Period 3 are presented in

Table 35 and Figs 238–239. Data is presented below for individual Phases within this Period.

Phase 4. Construction of Amphitheatre 1a

The sole fragment:

- 5 SG indeterminate form; fragment weighing <1 g. A (545). Probably Flavian, but imprecisely datable.

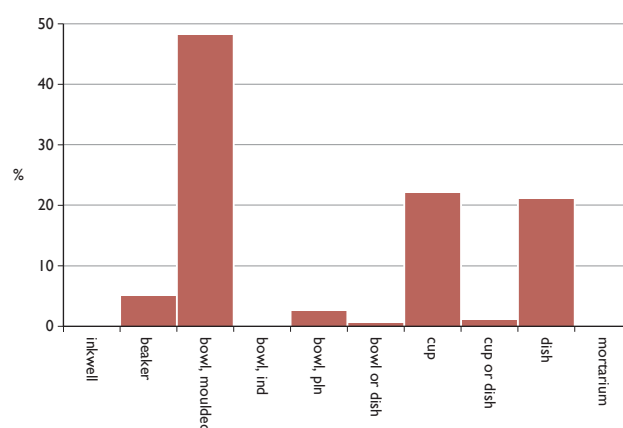


Fig 238 Proportions of vessel types in Period 3, Phases 4–7 (323 vessels, maximum nos, excluding indeterminate types).

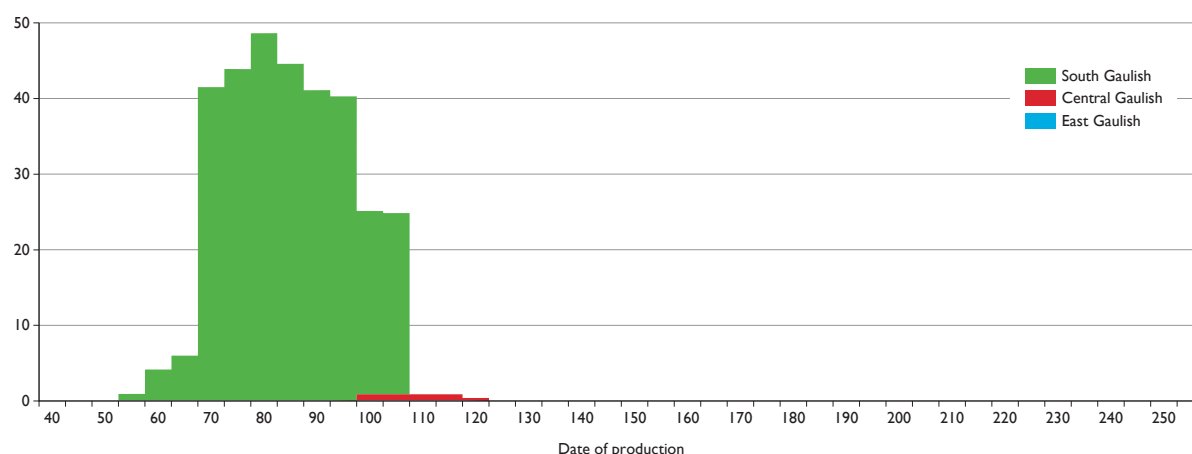
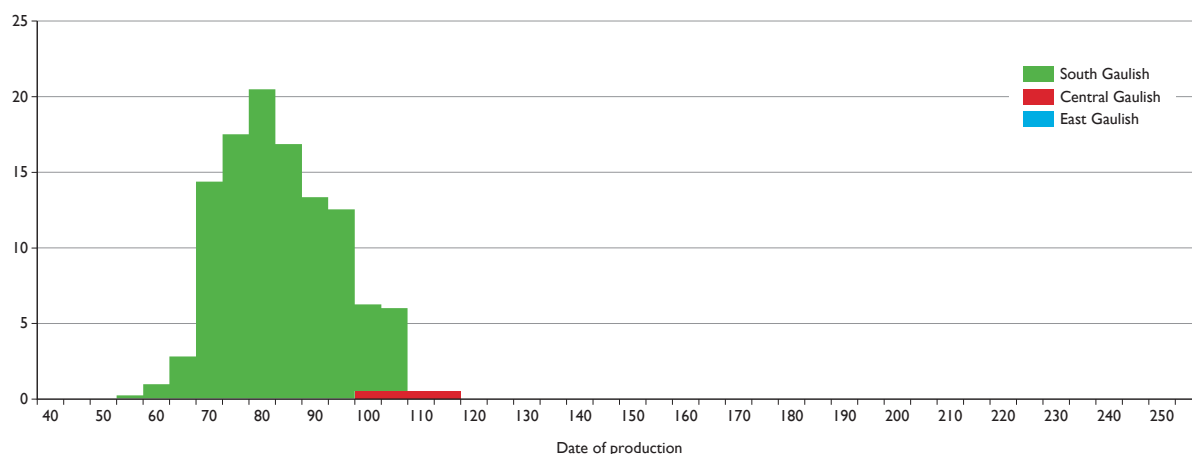


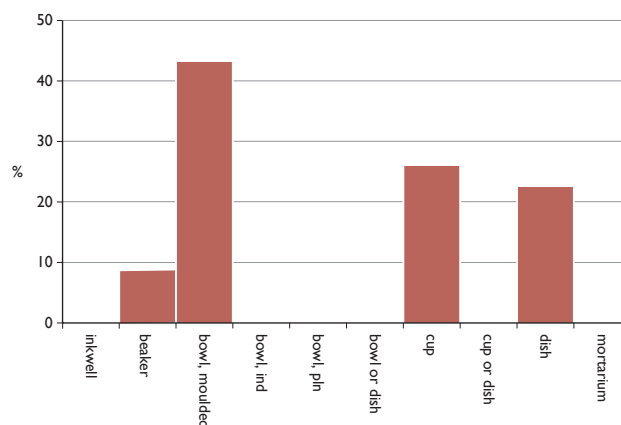
Fig 239 Histogram representing all samian ware in Period 3, Phases 4–7 (maximum nos of vessels: 323).

Table 36 Summary of samian ware in Phase 5.

Phase	Sherds	Vessels (max nos)	EVEs (rim)	Weight	Average sherd-weight	Sherds <1 g
5	118	109	0.99	292 g	2.5 g	64

**Fig 240** Histogram representing stamped and/or decorated samian ware in Period 3, Phases 4–7 (maximum nos of vessels: 112)**Table 37** Samian forms in Phase 5 (maximum nos of vessels).

Form	SG	CG	EG	Total
15/17	1			1
15/17 or 18	1			1
15/17R	1			1
15/17(R) or 18R	1			1
18	2			2
18 or 18R	5			5
18R	2			2
27	14			14
35	1			1
29	7			7
37	17			17
67	5?			5?
Ind	52			52
Total	109	-	-	109

**Fig 241** Proportions of vessel types in Phase 5 (58 vessels, maximum nos, excluding indeterminate types).**Phase 5. Use of Amphitheatre 1a**

The samian vessels, all recovered from Area A, are summarised in Tables 36–38 and Figs 241–242. They comprised mostly fragments of rubbish; over half of the 118 sherds were mere scraps weighing <1 g. However, one dish surviving in almost complete profile (1216) was probably a Flavian product, displaying little wear from use (Cat no 9). Of 109 vessels found in this Phase, the earliest were

products of the Neronian-Vespasianic period, one a stamp (Cat no 6). The great majority was dated within the Flavian period. Moulded bowls comprised 41% of the identifiable vessel types and included Domitianic products. For the significance of bowls of form 29 and 37 proportionally, see the discussion of vessel types; here they were present in the ratio 7:17, and (although a larger sample would be more meaningful statistically) this would suggest accumulation of the material some years after AD 85/90.

Amongst the potters' stamps from these excavations, one of only two which were dated firmly after AD 85 was found in Phase 5: the latest samian vessels in this phase include this dish by a potter who was active AD 85–105 (Cat no 8). This was associated with a fragment of a Domitianic

Table 38 Types of vessel in Phase 5 (maximum nos of vessels).

Phase	dish	cup	cup or dish	bowl or dish	bowl, plain	bowl, ind	bowl, moulded	ind, moulded	beaker	handled vessel	ind	Total
5	13	15					25		5?		51	109

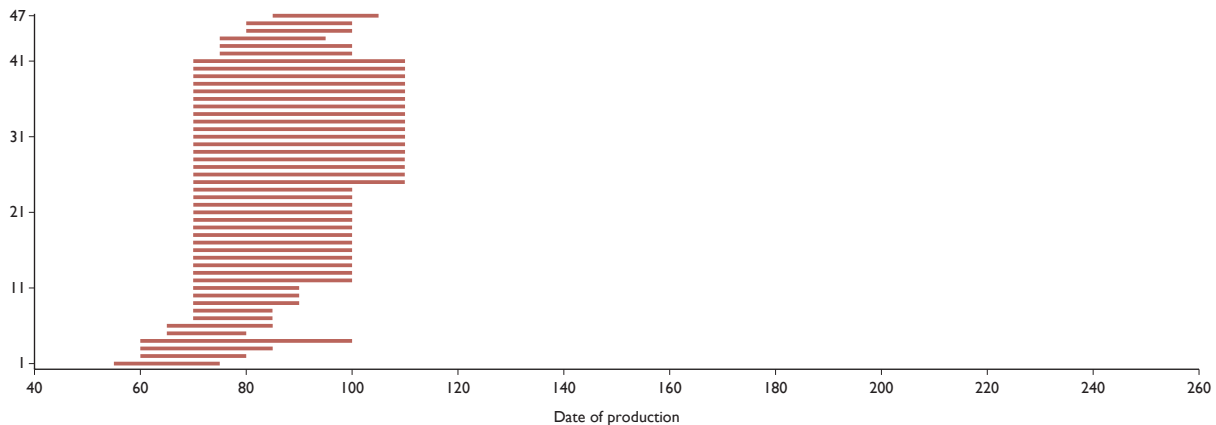


Fig 242 Floating bar diagram showing date-ranges of vessels in Phase 5 (maximum nos of vessels, excluding scraps: 47).

bowl, a Flavian vessel which bore a graffito (Cat nos 13 and 20, respectively) and also a coin of Domitian, dated AD 85 (CO 30). Their context, (625), was the final deposit before the external stair of Phase 6 was constructed, and the coin supported by the samian evidence gives the *TPQ* for the building of the stair and for Amphitheatre 1b. Remnants of four beakers, Cat nos 15–18, were also deposited in (625), amongst a group largely of Flavian origin, but comprising mostly fragments. In (1077), another fragment of beaker (Cat no 19) was associated with a remnant of portable oven.

In (1152), the sealing deposit over pit (1256), were sherds from two samian bowls, one dated *c* AD 65/70–80 or a little later and the other probably Domitianic (rather than Vespasianic): Cat nos 10 (i) and 14, respectively. This deposit was overlain by a fine road surface (1028); thus, the late dating of Cat nos 8 and 14 is a *TPQ* for the road of Phase 7, which is the level from which Amphitheatre 2 (Phase 8) was built.

Stamped and/or plain ware

6 SG cup, a delicate vessel and probably form 27. The stamp [P]ONTI represents die 24a of Pontus (Pontius?); see *NoTS* 2011, vol 7, 170. Die 24a was recorded on form Ritterling 8 at La Graufesenque, but is known on form 27 at several British locations, including Wroxeter (*NoTS* 2011, vol 7, 174); other stamps are recorded from Chester. He was active AD 65–95 and one of his later cups was noted at Holt (Dickinson in Ward, M 1998, 66 no 39), but the bulk of his output seems to date from the early 70s (*NoTS* 2011, vol 7, 176). This delicate cup could have been produced in the late-Neronian period, rather than in

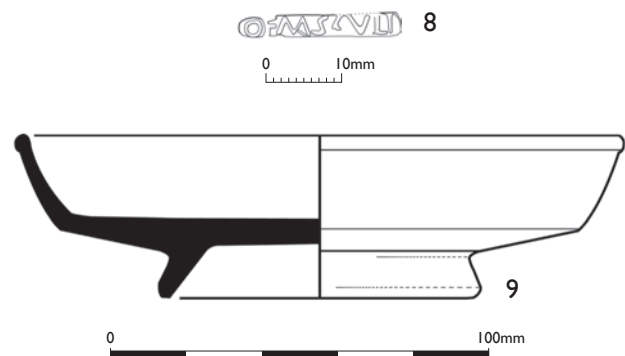


Fig 243 Samian dishes from Phase 5, Cat nos 8 and 9.

the 70s. Weight <1 g. A (625) Sa <4710>; SF 9802. *c* AD 65–75/80.

7 SG cup, form 27 g. A battered fragment of stamp by an unidentified La Graufesenque potter: probably ...]VS·F or ...]VS·F[E] rather than ...]IS·F[... Weight 3 g. A (625) Sa <4164>; SF 9813. *c* AD 70–100.

8 SG dish: a burn fragment from a heavy base of form 15/17, 15/17R or 18R. Stamped OFMASCVKI (with the MA ligatured). Previously known as Mascuus and now L. Tr- Masculus (*NoTS* 2009 vol 9, 92), he worked at La Graufesenque AD 85–105, being represented by numerous stamps at Flavian foundations. This example appears to represent die , although the transcription diverges from the illustration, which was by another potter (*NoTS* 2009, vol 9, 92–3); it occurs on form 18 at Newstead and on 15/17 at more southerly sites in Britain. Several Chester

stamps include die 5a in the neighbouring civil settlement (Drill Hall 1983; report unpublished) and at Gorse Stacks (Wild 2012, 47, S7). Weight 6 g. A (625) Sa <4703>; SF 9413. AD 85–105. Fig 243

- 9 SG dish, form 18; an almost complete profile, but lacking the basal stamp. 12% of rim at diameter 16 cm, 18% of (little worn) footring at diameter 8 cm; height 4.3 cm and weight 40 g. A (1216); SF 10049. *c* AD 70–100. Fig 243

Selected moulded bowls

- 10a SG form 29. Upper zone: festoons whose outer element comprised chevrons, with beaded vertical separators ornamented by astragali. Close parallels at Rocliffe, an early-Flavian fort in North Yorkshire, and in the earliest phase at Castleford fort may suggest production *c* AD 65/70–80 or a little later; see Dickinson 2005, 165.94, catalogue no 95. Weight 7 g. A (1075) Sa <4722>; SF 10044. *c* AD 65/70–85. Fig 244
- 10b SG form 29. Below the moulding, an indistinct, textured/speckled animal. Above, a rosette (*Cala Culip* type Cb.9) beside corded medallion (CC Db.52) containing 14-spiked rosette (CC Cb.57). The medallion with rosette occurs on bowls of form 29 in the *Cala Culip* IV wreck: Nieto and Puig 2001, 236 no 166, stamped by Lucundus iii (active AD 70–90; *NoTS* 2009, vol 4, 315) and Nieto and Puig 2001, 295 no 270, stamped by Virthus. Virthus' career is dated broadly AD 45–85 (*NoTS* 2012, vol 9, 284), but many of his bowls were in the *Cala Culip* wreck which occurred 'most probably between 78 and 82' (B Hartley in Nieto and Puig 2001, 32). Two adjoining sherds, weighing 4 g. A (1152); SF 10037. *c* AD 65/70–80 or a little later. Fig 244
- 11 SG form 29. Lower zone: block of arrowheads; upper zone: festoons with opposing geese (Osw 2248 and 2290?) and elongated cones acting as diagonally corded separators. Separators with reversed striations were recorded at *Cala Culip* (CC Ce.31) and, with these geese in festoons, on form 29 from Chester's Foregate Street (Newstead 1948, pl 5.1). For the general composition, see form 29 from London (Dannell *et al* 2005, vol D-F, Frontinus Taf G1, no 3096) and for the geese in festoons above a scroll containing arrowheads, Knorr 1952, Taf 25.A, FRONTINI (RGZM Ser No 0004672). Corded separators often occur on bowls of both form 29 and 37 by this potter (some with die 9a'; *NoTS* 2009, vol 4, 111), who was active AD 70–95. Six adjoining sherds: rim 12% at 20 cm; weight 25 g. A (625); SF 9918. Probably *c* AD 70–85. Fig 244
- 12 SG form 29. Lower zone of a heavy bowl: straight godroons above (blurred) hound running over a cut-off grass-plant, a popular motif on form 37. For the general design on form 29, see Knorr 1912, Taf 6.13. Weight 9 g. A (625); SF 9920. *c* AD 70–85/90. Fig 244
- 13 SG form 37. Rather blurred decoration: ovolo (RGZM type 000188, when accessed 17/2/2017) above wavy line and coarse scroll with three different terminals (generally: RGZM Ser No 2001897). This ovolo recurs on several bowls at the amphitheatre. Weight 10 g. A (625); SF 9919. *c* AD 80–100. Fig 244
- 14 SG form 37. Orange-red slip on a hard-fired, orange-

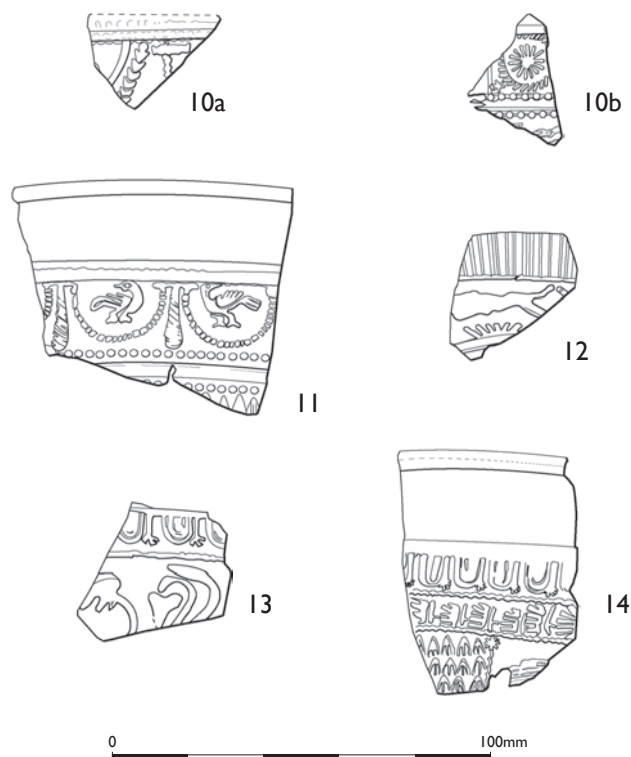


Fig 244 Samian pottery from Phase 5, Cat nos 10–14.

red and heavily calcareous fabric. Blurred ovolo with spikey-tipped tongue adjoining the egg, above a wreath of brush-like motifs (Nieto and Puig 2001, 142, type Ee.16a). Panelled decoration, including distinctive arrowheads and an indeterminate, textured animal. A similar ovolo (Nieto and Puig 2001, 122, Da.20; RGZM ovolo 000104, when accessed 17/2/2017) was present amongst *Cala Culip*'s unstamped vessels along with this wreath and arrowheads: Nieto and Puig 2001, nos 405, 661 (RGZM Ser Nos 2007008 and 200721). There, the ovolo was used by potters including Crucuro i, active AD 75–110. However, the amphitheatre ovolo was narrower and, if its shorter tongue here reflects its tip being an applied type, this could be a squashed version of RGZM Ser No 2002583 (ovolo 000103, when accessed 17/2/2017); Geoffrey Dannell noted (*pers comm*) these two ovolos as perhaps the same, but different impressions. The rim may have been smoothed off by the owner. 7% of rim at diameter 20 cm; weight 25 g. A (1152); SF 10042. Probably *c* AD 80–100. Fig 244

Beakers, etc

Four fragments found in context A (625):

- 15 SG beaker, Déchelette form 67. Internally slipped fragment from a very thin-walled vessel, weighing <1 g. A (625) Sa <4159>. Flavian.
- 16 SG beaker, form 67. Internally slipped, thin-walled fragment, weighing <1 g. A (625) Sa <4171>. Flavian.
- 17 SG beaker, form 67. A rather messy rim (flatter than Webster 2006, 17, fig 2.6). 7% of rim, one sherd weighing

Table 39 Summary of samian ware in Phase 6.

Phase	Sherds	Vessels (max nos)	EVEs (rim)	Weight	Average sherd-weight	Sherds <1 g
6	165	148	1.20	778.5 g	4.7 g	77

2 g in A (625) <4683> adjoining a chip, weighing <1 g, <4175>. *c* AD 70–100/110.

- 18 SG beaker, form 67 with a flattened rim (Webster 2006, 17, fig 2.6). 5% of rim, weighing 3 g. A (625). *c* AD 70–100/110.
- 19 SG moulded vessel, rounded and possibly a ‘beaker’, but its thin-walled interior while showing some faint lines was smoothed; perhaps similar to Hermet 9 (Webster 2006, 26–28). Moulded decoration: winding scroll with bird looking left (Osw 2266). Weight 1 g. A (1077). Flavian.

Evidence of use: graffito

- 20 SG base, probably dish form 18. Scored externally above the footring is the end of a vertical downstroke. Epigraphist Roger Tomlin notes that, since it is apparently isolated, it would have been the owner’s name abbreviated to its initial letter (and thus: F, P or T). A (625) <4698>; SF 9960. Weight 11 g. Production-date *c* AD 70–100. Table 28.

Phase 6. Amphitheatre 1b

All but six fragments (from Area A) were found in Area B (Tables 39–41, Figs 245, 246). The total of 165 sherds representing 148 vessels comprised mainly fragments of rubbish; almost half were scraps weighing <1 g (eg Cat

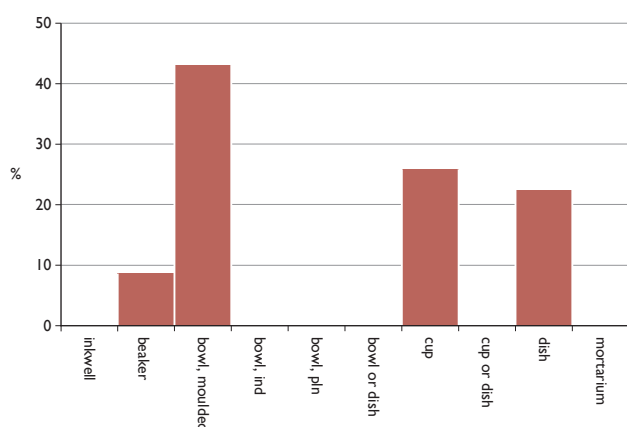


Fig 245 Proportions of vessel types in Phase 6 (96 vessels, maximum nos, excluding indeterminate types).

Table 40 Samian forms in Phase 6 (maximum nos of vessels).

Form	SG	CG	EG	Total
15/17 or 15/17R	2			2
18	5			5
18 or 18R	3			3
18R	4			4
18 or 18/31	1			1
18R or 18/31R	1			1
27	17			17
33	1			1
35	1			1
35 or 36	1			1
Curle 11	4			4
29	4			4
29 or 37	4			4
30 or 37	2			2
37	40			40
67	2			2
ind, moulded	1			1
Ind	55			55
Total	148	-	-	148

nos 6, 10). One stamped vessel was produced in the range *c* AD 65/70–95 (Cat no 21) and amongst the many, certainly Flavian products, one stamped (Cat no 22) represented a potter active AD 75–110: the dish itself was probably produced by AD 90. The latest vessels were produced in the Domitianic to earlier-Trajanic range (in general terms, *c* AD 80–110), some deposited in seating bank material (2612) (Cat nos 30–32, whilst no 33 was of uncertain origin). There were, however, no certainly Trajanic products in this phase. Two pieces, in seating bank (2612) and (2500), showed evidence of tooling or refurbishment, the former as a counter (Cat nos 36–7). Of 25 sherds recovered from (2513), half were burnt (including Cat nos 25–6).

Table 41 Types of vessel in Phase 6 (maximum nos of vessels).

Phase	dish	cup	cup or dish	bowl or dish	bowl, plain	bowl, ind	bowl, moulded	ind, moulded	beaker	handled vessel	ind	Total
6	17	19	2	1	4		50	1	2		52	148

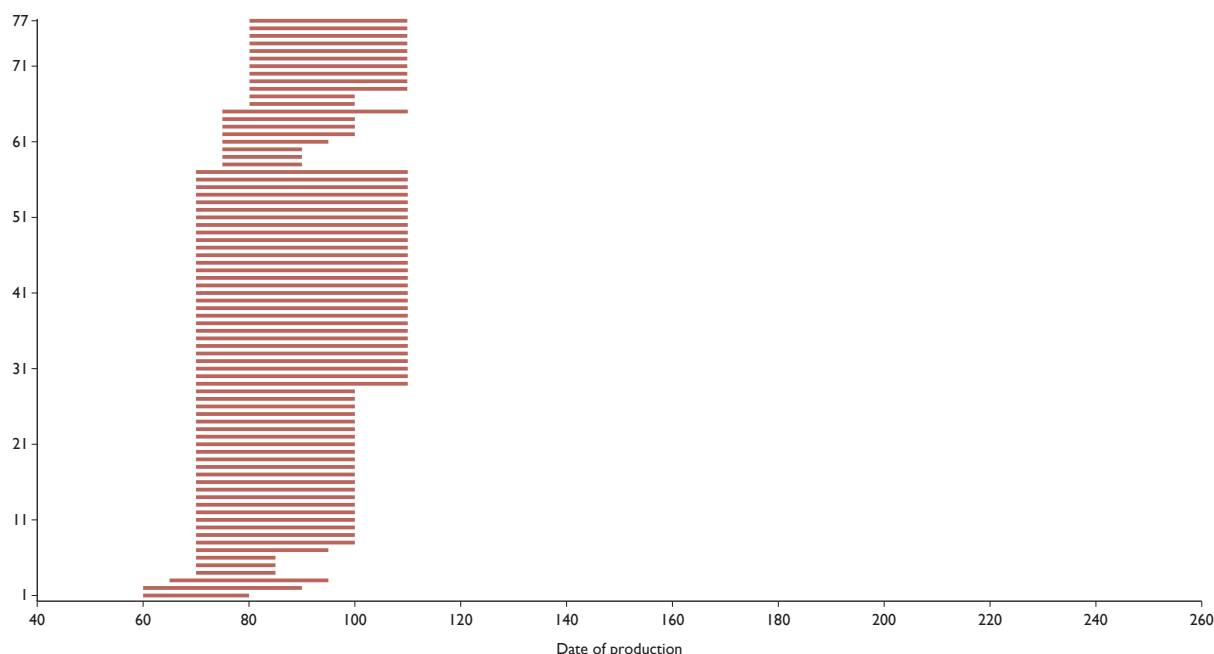


Fig 246 Floating bar diagram showing date-ranges of vessels in Phase 6 (maximum nos of vessels, excluding scraps: 77).

There was clearly a preponderance of moulded bowls and scarcity of dishes in Phases 5–7, conspicuously so in the large body of material from Phase 6. Aside from two beakers here, moulded bowls constituted 52% of identifiable vessel types. The ratio of certainly identified examples of form 29 to form 37 was 1:10, indicating that the material accumulated some years after AD 85/90.

Gladiatorial or related scenes occurred on two or three of 32 bowls retaining decoration; they were deposited in material associated with the construction of the seating bank, in contexts (2461), (2498), and (2612) which also contained counters in various materials. Another bowl (probably a Domitianic product) displays both Diana and Victory; it survived in almost complete profile in a related context, (2543), along with a potter's stamp dated *c* AD 65/70–95 (Cat nos 29 and 21).

All of the catalogued sherds came from the seating bank deposits of Area B.

Stamped ware

- 21 SG, probably cup form 27, but a mere scrap. A messy fragment of stamp ©SEV[ERI] represents die 7t of Severus iii (*NoTS* 2011, vol 5, 251), but here ©S is lightly impressed and EV is in high relief. Die 7t was previously recorded in Chester's civil settlement, representing a potter active at La Graufesenque AD 65–95, but whose output was mostly Flavian (*NoTS* 2011, vol 5, 265). Weight 1 g. B (2543) Sa <4347>; SF 9157. *c* AD 65/70–95.
- 22 SG dish, form 18. Stamp OFCO·IVC by a potter listed as 'Cosius Iucundus (A. Co- Iuc-)?' of whom this stamp represents the unbroken die 1a (*NoTS* 2008, vol 3, 130). It was recorded on a dish from Greyfriars Court in the western *canabae* (Ward, M 2012b, 62; *NoTS* 2008, vol 3,

130). Other Chester stamps include the broken die, 1a', of late-Flavian origin, found previously at the amphitheatre and (Cat no 90) here in Post-Roman context B (2001). Cosius Iucundus was active AD 75–110 (*NoTS* 2008, vol 3, 131) and this dish was probably an early product. There are slightly 'smoked' spots, mostly under the base. The footing (53% at diameter 9 cm) shows little wear, if any. Weight 64 g. B (2552); SF 8674. *c* AD 75–85/90.

Selected moulded vessels

- 23 SG moulded vessel of indeterminate, rounded form with extremely thin walls if a goal, but an unlikely (closed) beaker as its interior was fully smoothed. Scroll composition: beside a decorative motif, a small figure with unusually detailed head similar to, but smaller than, *bestiarius* Osw 1078 (Knorr 1905, Taf 10.6) or archer (Osw 267). Weight 1 g. B (2498): Sa <4380>. Late-Neronian or Vespasianic?
- 24 SG bowl, form 29; a large vessel with a deep groove below the decoration, cutting off the lower part of panelling. A triple medallion, in a composition favoured by various potters (eg Mees 1995, Taf 3 stamped by C. Valerius Albanus); within, a partially impressed and/or poorly moulded archer. Archer and saltire with leaf and vertical wreath appear on unstamped form 30 at La Graufesenque (RGZM Ser No 1000722). Chester's archer seems a more angular version than illustrated at Cala Culip (*CC* Aa.36), or Pompeii (Dzwiza 2004, M1.4) and elsewhere (Dannell *et al* 2005, vol M.1, Meddillus, Taf D3, no 0707); it may be the unusual type found in Carlisle's annexe ditch (Dickinson 1992, 57, no 10). Cala Culip's debased type Aa.36 appeared on form 37 (Nieto and Puig 2001, nos 578, 654–5), but the medallion and similar wreath were recorded with archer Aa.31 (Nieto and Puig 2001, 491, no 671). Saltire and details as on form 29 by Iucundus iii

- (Knorr 1952, Taf 31.A and E) and, indistinctly, Dannell *et al* 2005, vol I, Iucundus iii Taf F2, no 0577: a potter active AD 70–90 (*NoTS* 2009, vol 4. 315). Weight 23 g. B (2543) Sa <4347>; SF 10058. *c* AD 70–85. Fig 247.
- 25 SG bowl, form 29. Fragment of basal decoration: a common composite motif with spirals and rosette (Knorr 1912, Taf 4.1). Its common occurrence on form 37 included Cat no 102, from a Post-Roman context. Badly burnt after breakage. Weight 4 g. B (2513). *c* AD 70–85.
- 26 SG bowl, form 37. Ovolos, probably RGZM ovolo 000288 (when accessed 17/2/2017), above a blurred shell-like or leafy wreath and festoons with corded vertical dividers, and 6-petalled rosette. Ovolos as used by various potters, including Masclinus (active AD 65–85; *NoTS* 2009, vol 5) and on Flavian form 37. For the stirrup-leaves in festoons with similar ovolo, see RGZM Ser No 2007683 from Vindolanda; wreath as at Wall, Shrops, probably with this ovolo, but blurred (Hartley nd, disc 4, Wall_08, B.S51). Six adjoining sherds with slight burning; 12% of rim at diameter 18 cm; weight 34 g. B (2513); SF 10059. *c* AD 70–85. Fig 247.
- 27 SG bowl, form 37; glossy, with infrequent calcitic inclusions. Ovolos (RGZM ovolo 000188, when accessed 17/2/2017) and scroll with leaf (Cala Culip's type Ca.100 and at Vechten, Knorr 1919, pl 37.N, GERMANI F) and Nile geese (CCs Bf.2 and 34; Osw 2244 and 2286?). The scroll's leaf and spindles resemble those on a Germanus-style bowl in the Bregenz Keller (Jacobs 1913, Taf 1.1). For the amphitheatre bowl's leaf and ovolo, see from Richborough, RGZM Ser No 2001510. Weight 26 g. B (2461); SF 10063. Flavian, and probably before 90. Fig 247.
- 28 SG bowl, form 37. A small fragment of the gladiatorial group Osw 1021 and 1020, with the former's crest shortened (see Mees 2014, GLA-r 019, used by potters including Vitalis ii). Weight 3 g. B (2461). *c* AD 70–100.
- 29 SG bowl, form 37. An excellent product, but with blurred decoration. Ovolos (RGZM ovolo 000032, when accessed 17/2/2017) associated primarily with Mercator i, but also with M. Crestio. Basal wreath of standard leaf-and-bud motifs (CC Eb.49a). Divided panels: saltire with common leaf-and-bud, geese (CC types Bf.31 and Bf.34; Osw 2286) and triple medallion (RGZM Ser No 2000985, La Graufesenque). The corded column on triple base is more clearly impressed than CC Ce.37 (Nieto and Puig 2001, 401 no 506). This ovolo was used with Victory at La Graufesenque (RGZM Ser No 2002035) and with Diana, goose and basal wreath on two Vindolanda bowls (RGZM Ser nos 2004901a–b). This Victory (Mees 2014, VIC 001 with wings more feathery-tipped than Osw 814/Déch 481) was not noted at Cala Culip. Diana (Mees 2014, DIA 005, for Osw 104B) wears diaphanous, 'Oriental', trousers and holds a hare instead of hind, as on a Middlewich bowl with similar saltire (Ward, M 2008a, 156, fig 88.70). Mees records both figures for potters T. Iul. Aplastus, Biragillus i, L. Tr. Masculus and Mercator i, working across the range AD 70/80–110. Mercator's style occurs commonly at Domitianic foundations (*NoTS* 2010, vol 6, 86), but aside from the amphitheatre bowl's blurred decoration, it was an exceptionally good product. The almost complete profile, with slight signs of burning and little-worn footring, was provided by five sherds (112 g) in Phase 6, B (2543), adjoining two (34 g) in Post-Roman contexts (2425) and (2002), all illustrated here; SF 10065. 12% of rim at diameter 22 cm, 20% of footring at 9 cm; height 9 cm; total weight 146 g. Probably *c* AD 80–100. Fig 247.
- 30 SG bowl, form 37. Blurred ovolo (RGZM ovolo 000027", when accessed 17/2/2017), one in a series of ovolos associated with M. Crestio, who was active AD 80–110 (*NoTS* vol 3 2008, 174); see Cat nos 74 and 116 below. Festoons were used similarly with this ovolo at La Graufesenque (eg RGZM Ser No 2005517). Weight 6 g. B (2500). *c* AD 80/90–110.
- 31 SG bowl, form 37. S-shaped godroons (Cala Culip type Cb.24a or similar) below divided panelling infilled by arrow-heads in a style suggestive of potters including M. Crestio and Crucuro i (eg M. Crestio's form 37, RGZM Ser no 0004523). To right, a saltire with leaf-and-bud and 7-petalled rosette. Footring (7% at diameter 9 cm) little worn; weight 23 g. B (2612); SF 10056. *c* AD 80–100. Fig 247.
- 32 SG bowl, form 37; a small vessel lacking its rim, but perhaps of diameter 15–16 cm. Dull slip on fabric with few inclusions; slightly burnt. Poorly impressed on a guideline above horizontal wavy line was an ovolo (RGZM ovolo 000062', when accessed 17/2/2017) used by Crucuro i, active AD 75–110. Gladiators, slightly different from Oswald's: *retarius* (Osw 1043 variant; compare Dzwiza 2004, type M1.2, CC Aa.1 and Mees 2014 BES-002 by M. Crestio) and *secutor* (Osw 1044 variant; Mees 2014, GLA-l 009 used by GRA-). The *retarius* at least was recorded previously at the amphitheatre (1976, no 75) and the pair probably appears at Holt (Grimes 1930, fig 35, nos 19 and 23). A similar duo occurs at Espalion (Tilhard and Bouquillon 2009, pl 8.254–5), but at La Graufesenque the pair accompanies that ovolo (RGZM ovolo 000035, when accessed 17/2/2017) which is common on unnamed bowls at British sites under Domitianic occupation (with this gladiatorial group at Wall, Staffs: Hartley nd, disc 4, Wall_08 B.S.91). As on this amphitheatre bowl, the duo is known at La Graufesenque with the same ovolo and guideline (RGZM Ser No 2005989). Weight 10 g. B (2612) Sa <4373>; SF 10062. *c* AD 80/85–110. Figs 247.
- 33 SG(?) bowl, form 37 with a strong chamfer below the decoration, of uncertain origin (Ward, M 2016, 148). Made in a ware unusual for South Gaul, resembling some from Les Martres-de-Veyre but also some early EG products: orange-red slip on hard, orange-buff fabric lacking calcite and mica, fracturing unusually. Panelling: left, large arrowheads; right, remnants perhaps of an animal's feet above, probably, a rosette or two. Basal border, seemingly a wavy line as used in South Gaul and (usually below a wreath) at Les Martres-de-Veyre in X-13 style. A basal chamfer may simply reflect potters' personal idiosyncrasies: it occurred at some SG workshops, and was relatively frequent amongst Banassac's bowls (Brenda Dickinson, pers comm). The amphitheatre fragment, however, remains enigmatic. Weight 6 g. B (2612) Sa <4381>; SF 10066. Late 1st or early 2nd century? Fig 247.

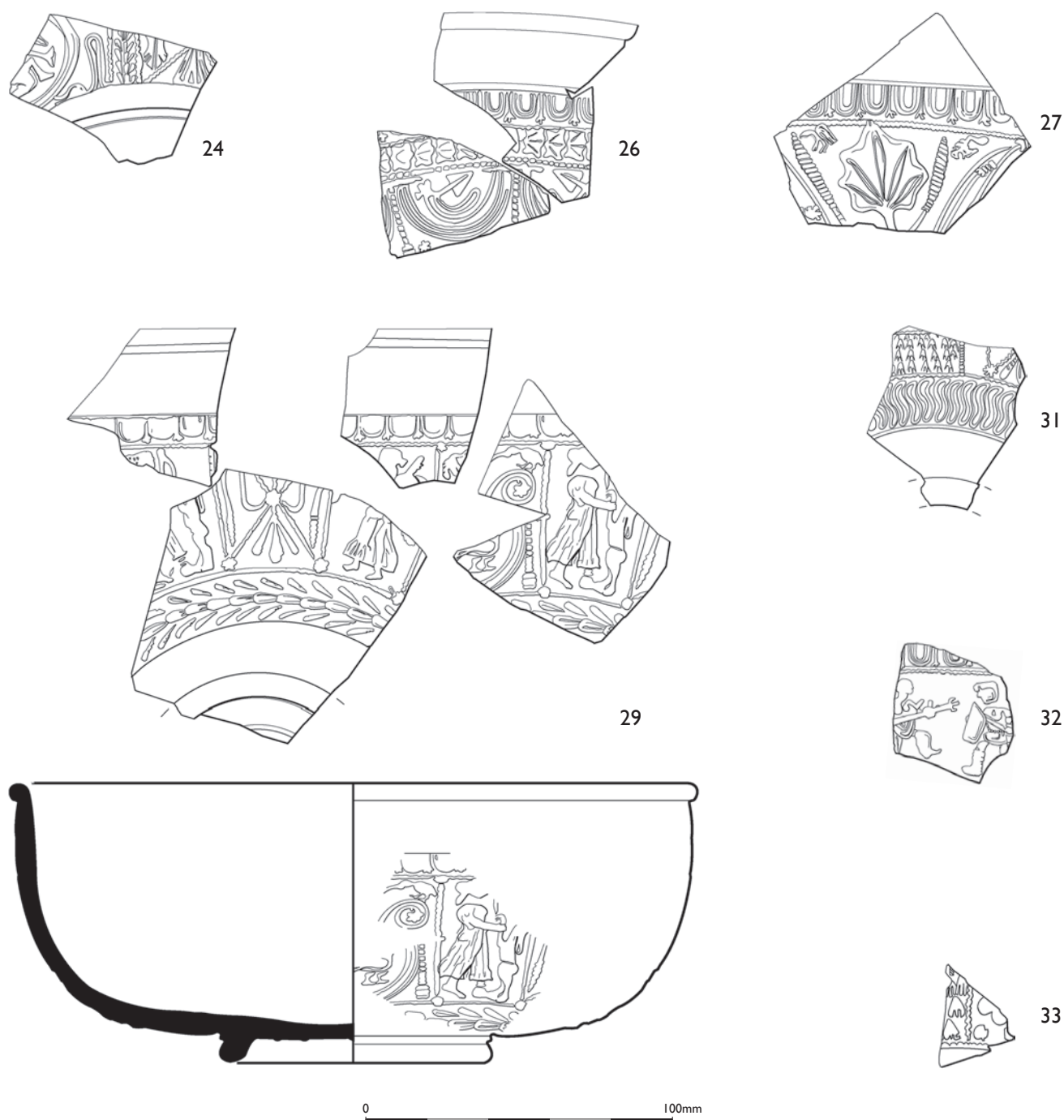


Fig 247 Samian pottery from Phase 6, Cat nos in range 24–33.

Beakers

- 34 SG beaker, form 67; slipped internally. Chip with orange-red slip with a (moulded) poppy-head (Hermet 1934, pl 90.35). Weight <1 g. B (2612) Sa <4381>. Flavian.
- 35 SG beaker, Déchelette form 67; for rim, see Webster 2006, 17, fig 2.1. 12% at rim diameter 7 cm. Weight 3 g. B (2498): Sa <4380>. c AD 70–100/110.

Evidence of refurbishment

- 36 SG indeterminate form, probably dish rather than cup. A counter, re-worked unusually from the wall/base junction; diameter 15 mm; c 5 mm thick. Weight 1 g. B (2612) Sa <4381>; SF 9158. c AD 70–100/110. Fig 313.
- 37 SG moulded bowl, form 37. The footring (40% at diameter 10 cm) has been smoothed down, presumably for better balance; there is evidence of further re-working after it was smoothed, but this further tooling on its standing surface

Table 42 Summary of samian ware in Phase 7.

Phase	Sherds	Vessels (max nos)	EVEs (rim)	Weight	Average sherd-weight	Sherds <1 g
7	104	65	1.32	382 g	3.7 g	36

Table 43 Samian forms in Phase 7 (maximum nos of vessels).

Form	SG	CG	EG	Total
18	3			3
18 or 18/31	1			1
18 or 18R	1			1
18/31 or 18/31R		1		1
18/31R	1			1
18R	3			3
18R or 18/31R	1			1
27	8	1		9
35	1			1
36	1			1
Curle 11	1			1
29 or 37	2			2
30	2			2
37	15	2		17
67	2			2
Ind	19			19
Total	61	4		65

is unlikely to represent (unsuccessful) repair-work, or indeed nicking. Weight 94 g. B (2500). *c* AD 70/80–100.

Phase 7. Use of Amphitheatre 1b

Again, a large proportion of this collection (104 sherds; 65 vessels) comprised scraps weighing <1 g (Tables 42–44, Figs 248, 249). Of the few firmly datable vessels, the earliest were Flavian products (eg Cat nos 40–41), including a cup scattered in fragments between contexts related to the shrine (Cat no 39). The only stamp (Cat no 38) was not attributable to a specific potter, but this cup was made within the Domitianic to earlier-Trajanic period (*c* AD 80–110), its complete profile comprised of fragments scattered between Phase 7 (mostly) and Phase 8. Amongst the many contemporary vessels, a graffito was incised on a dish made *c* AD 80–100/110 (Cat no 45) and again scattered in fragments across contexts. Aside from a similar spread of SG material as in previous Phases, four CG products from Les Martres-de-Veyre were represented: the latest here (Cat no 42) was a bowl, probably a Trajanic product that was

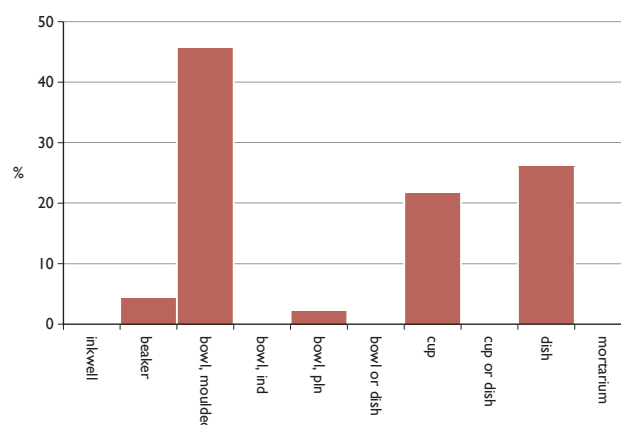


Fig 248 Proportions of vessel types in Phase 7 (65 vessels, maximum nos, excluding indeterminate types).

found in gravel surface (716). Recorded in the database are fragments of three other products of workshops at Les Martres-de-Veyre, dated *c* AD 100–120/125 and deposited in (738) and (1056). A larger proportion of dishes was represented in Phase 7 than in earlier phases, but even so, moulded bowls and beakers were found in greater proportions than would normally be expected.

Samian ware from contemporary contexts from 2001, Trench XI, (M224, fill of pit M225) included a stamp dated in the range AD 65–110 on a dish that was most probably made before *c* AD 85: see Cat no 45 (i), Appendix 2 and Appendix 3 no 5.

Stamped and/or plain ware

- 38 SG cup, form 27 g. A large vessel retaining two fragmentary letters from a stamp by an unidentified La Graufesenque potter, set off-centre and probably reading ...]SI[... or ...]ST[... rather than ...]IS[... 12% of rim at diameter 12 cm, 5% of footring (showing slight wear from use), height 5.4 cm. Complete profile, formed by ten sherds weighing 51.5 g in Phase 7, A (555) including SF 8790, an adjoining sherd weighing 1 g in (841), and one weighing 4 g in Phase 8, (554). *c* AD 80–110. Fig 250
- 39 SG cup, form 27 or 27 g, lacking the base. 70% of rim at diameter 11 cm. 22 sherds (10 chips, each <1 g): three weighing 4 g in A (755), three weighing 4 g in (790), and 16 weighing 21 g in (795) including Sa <4199>. *c* AD 70–100.

Table 44 Types of vessel in Phase 7 (maximum nos of vessels).

Phase	dish	cup	cup or dish	bowl or dish	bowl, plain	bowl, ind	bowl, moulded	ind, moulded	beaker	handled vessel	ind	Total
7	12	10			1		21		2		19	65

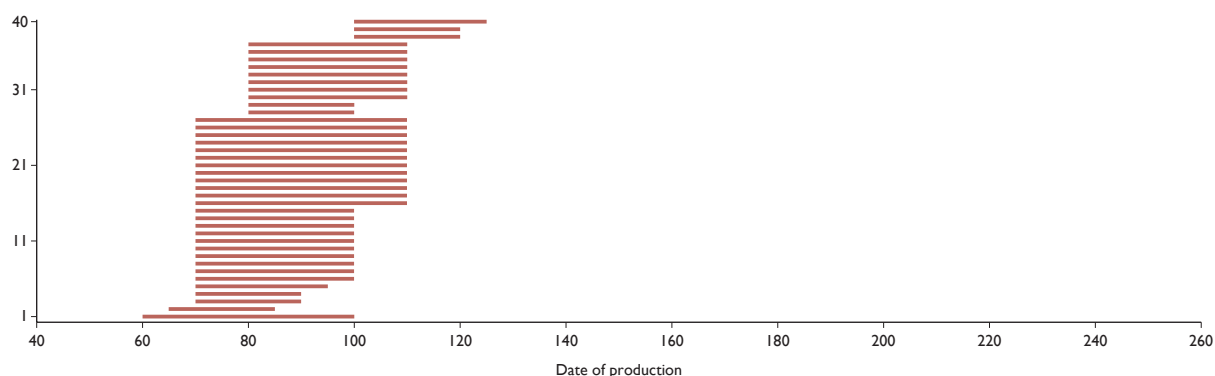


Fig 249 Floating bar diagram showing date-ranges of vessels in Phase 7 (maximum nos of vessels, excluding scraps: 40).

Selected moulded bowls

- 40 SG form 37. A Germanus-style tree and hare stand above a basal wreath of hollow bifid motifs (slightly larger than CC Ea.42a). Weight 32 g. A (126). Flavian, probably before c AD 90.
- 41 SG form 37 with an intentional, deep groove inside the lower wall; highly fired, with large calcareous inclusions. Divided panelling with large rosette terminals, and infilled by large arrowheads and diagonal wavy lines: Venus holds a daisy-like mirror (Osw 313), but with the lower right leg poorly moulded and here chipped off. Venus (Mees 2014, VEN 001) occurs with the leg intact on form 37 by Calus ii at La Graufesenque, whereas it is partial on his bowl form 30 at Vertault (RGZM Ser Nos 0004396 and 0004394). She occurs in divided panels with the same rosettes, but with leg drawn intact, at Brecon (Pryce 1926b, 188, fig 84, S179). Her leg is visible on a bowl at La Graufesenque, but neither leg survives on a Vindolanda sherd (RGZM Series Nos 2002262 and 2004975 with ovolo numbered 000188, accessed 17/2/2017). Her foot was illustrated as complete on a bowl amongst the Bregenz Keller finds (Jacobs 1913, Taf 3.21) and it clearly survived on another at Wall, Staffs (Hartley nd, disc 4, Wall_02 1971). As at Bregenz and Brecon, so the amphitheatre example of Venus appears larger than that on a late bowl at Ribchester (Wild 1988, 49–50 no 143); however, Chester's Venus shows a particularly well-detailed mirror. Weight 10 g. A (126); SF 9537. Probably c AD 80–100. Fig 251.
- 42 CG form 37, in a very highly fired, orange-red ware from Les Martres-de-Veyre. Panelling bordered vertically by a fine beadrow (Rogers A1) with a beautifully modelled and moulded figure, probably Bacchus (Osw 570, listed for Ioenalis in Stanfield and Simpson 1958, 63). Plant (Rogers G6), indistinctly impressed mask (Osw 1303?) and rosette (C244 in Potter X-13's style). Motifs including the plant are

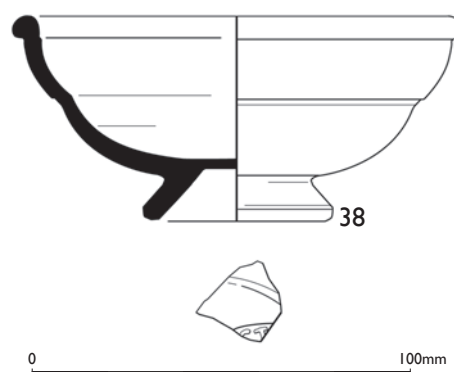


Fig 250 Stamped samian vessel from Phase 7, Cat no 38.

recorded from London (Stanfield and Simpson, pl 38.444) and Les Martres-de-Veyre itself: Terrisse 1968, pl 42. 286; Romeuf 2001, pl 51.1, 'style de X-11. IOENALIS'; Ioenalis was a potter, active AD 100–130, who worked almost entirely at Les Martres-de-Veyre (NoTS 2009, vol 4, 291). The mask and figure appear in X-11's style on other London bowls (Stanfield and Simpson, pls 37.433 and 38.439, 449), while the mask occurs, indistinctly as here, at Les Martres (Romeuf 2001, pls 51.6 and 52.31). Style of X-11, and a product from Les Martres-de-Veyre. Weight 4 g. A (716); SF 9922. Probably c AD 100–120. Fig 251.

Beakers

- 43 SG form 67. Wallsherd, slipped internally. Weight 3 g. A (725). c AD 70–110.
- 44 SG form 67, very thin-walled fragment; slipped internally, but with a distinct, unslipped patch. Scroll decoration, thickly applied *en barbotine*. Weight <1 g. A (876); probably Flavian.

Evidence of use, including graffiti

- 45 SG dish, with slightly orange slip; rim grooved internally, but probably form 18, lacking its stamp. Scratched underneath the heavily grooved base within the (missing) footring, Roger Tomlin notes a series of seven incisions now very incomplete, the last being a long downstroke; too slight for identification, they suggest a short personal name in us, in the genitive case. 20% of rim at diameter 17 cm; total weight 30 g. Six or seven sherds, all in phase 7: three in A (838) with one adjoining in A (894), SF 9961; further sherds in (894), (899) and, probably, (557). Production-date *c* AD 80–100/110. Table 28.
- 45 (i) SG dish, form 15/17. Stamped [IV]LLINI· by Iullinus i, die 3a (*NoTS* 2009, vol 4, 361). Other dies by this potter, found in Chester fortress, include die 3b on dish form 18 from Northgate Brewery 1972, and die 3c on form 15/17 from the *canabae*. Hartley and Dickinson dated the activity of Iullinus i in the range AD 65–110; this dish was probably one of his earlier products. Two glossy fragments accompany the partially dulled base and a footring showing a little wear from use. A large, round hole of diameter *c* 7–8 mm was drilled, apparently from the outside inwards, through the base above the foot, through which hole the vessel is now broken. Unlikely to represent repair-work, intended purposes of its refurbishment are considered above (pp 240, 242–3). 47% of footring at diameter 8 cm; weight 72 g. 2001, Trench XI (M224) SF 128; Appendix 3 no 5. Dish most probably produced *c* AD 65/70–85. Fig 251.

Period 4: The Second Roman Amphitheatre**Phase 8: Construction of Amphitheatre 2**

Contexts allocated to Phase 8 included only nine samian sherds, (Tables 45–47, Fig 252), all of them scraps of residual rubbish, each weighing <10 g and two <1 g. Eight sherds represented four moulded bowls: the latest (Cat no 44), dated *c* AD 85/90–110, was deposited in (554) in which another sherd belonged to the stamped cup of which pieces were deposited in Phase 7 (Cat no 38).

Selected moulded bowls

- 46 SG form 37. Panelling in high relief: a fine saltire with arrow-headed infilling and 7-petalled rosette terminals over a leaf-and-bud wreath (CC Eb.61a or Eb.71a); see, from Cala Culip, Nieto and Puig 2001, 463 no 627. Weight 2 g. A (601). *c* AD 70–85.
- 47 SG form 37, with slightly orange surfaces. Ovolò (RGZM 000188, when accessed 17/2/2017), bordered above and below by a wavy line. A frieze with vertical, horizontally striped dividers between fringed festoons (suspended from neat, astragaloid ornaments) containing a double ring. The same ovolò, double ring and vertical separators occur on a Narbonne bowl (RGZM Serial No 2001234). One sherd, weighing 6 g, in A (601) Sa <4153>; four adjoining sherds, weighing 12 g, in A (678); SF 9921. Probably *c* AD 80–100. Fig 253
- 48 SG, probably form 37 rather than 29. A large winding scroll, with coarse tendrils. Weight 1 g. A (678). Flavian.
- 49 SG form 37. Blurred decoration: wavy-line border below

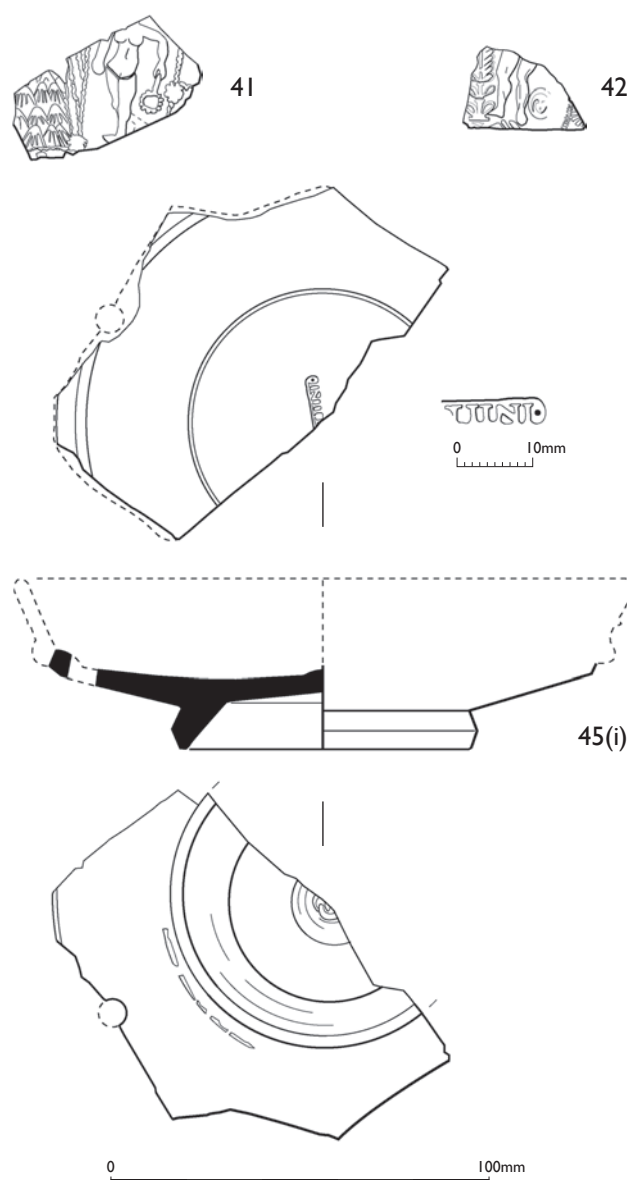


Fig 251 Samian pottery from Phase 7, Cat nos 41–45(i).

an ovolò with trifid-tipped tongue turned slightly right, one in a series associated with potters such as Biragillus, L. Tr- Masculus and contemporaries. Weight 9 g. A (554). *c* AD 85/90–110.

Phase 9. Use of Amphitheatre 2

A single fragment:

- 50 SG indeterminate form; a flake weighing <1 g. A (998). *c* AD 70–110.

Post Roman phases containing residual samian ware

In post-Roman contexts, many items are of particular interest, both intrinsically and in regard to site occupation (eg Cat nos 54, 59, 75). The proportion of bowls, as well

Table 45 Summary of samian ware in Phase 8.

Phase	Sherds	Vessels (max nos)	EVEs (rim)	Weight	Average sherd-weight	Sherds <1 g
8	9*	4	0.05	33.5 g	3.8 g	1

* including a fragment of form 27g which adjoins a sherd in Phase 7 (841); Cat no 38.

Table 46 Samian forms in Phase 8.

Form	SG	CG	EG	Total
29 or 37	1			1
37	3			3
Total	4			4

as cups, decreased particularly from Phases 11 and 12 onwards, while that of dishes rose (Table 21). However, SG products continued to constitute more than 75%. The earliest vessel excavated was probably a pre-Flavian cup of form 24 that was deposited in Phase 10 (Cat no 51). Amongst the three or four East Gaulish vessels (Cat nos 60, 97, 98 and 126), the latest was probably made in the later 2nd century, and probably in the Argonne region. As mentioned above, there were no samian mortaria (a type produced after *c* AD 170 at earliest). The latest products found during the excavations were a very few CG vessels of later 2nd-century origin: eg Cat nos 59 (in Phase 10), 124–125 and 136. These last three provide evidence of use and/or refurbishment (for which, see also Cat no 57). There was no evidence amongst the samian ware for later-Roman activity in the vicinity: there were no 3rd-century EG products, nor were there spindle-whorls suggestive of late-Roman or early post-Roman activity.

The archaeology of these phases is addressed in Volume 2 of this report. The residual Roman material is described and catalogued here because it certainly derives from material churned up in later activity, but deriving from Roman phases on site.

Periods 5–6 (Phases 10, 11a, 11b): Change of use and robbing

Phase 10 Change of use

Samian ware from contexts associated with the change of use of the building in the late-Roman or immediate post-Roman period is summarised in Tables 48–50 and Figs 254, 255.

Stamped ware

51 SG cup form 24. A burnt, but very glossy basal sherd, stamped [S]ILVANI by Silvanus i, die 11c (*NoTS* 2011, vol 8, 295): a potter active AD 30–80, but in the period 45–65/70, his output included ample quantities of plain samian, particularly cups (*NoTS* 2011, vol 8, 304). Die 11c is recorded on this early cup form 24 as also Ritterling 8, in addition to many cups of form 27 and 27 g. A bowl of form 29 from Chester fortress exemplifies his latest die (3a) and was taken to suggest Vespasianic production (*NoTS* 2011, vol 8, 303; Grosvenor Museum archive: ‘presumably Princess St 1939’). However, the amphitheatre cup appears probably a pre-Flavian product. Weight 3 g. B (2457) Sa <4379>; SF 9816. *c* AD 45/55–70, and probably Neronian.

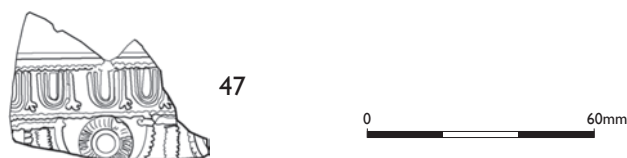


Fig 253 Samian sherd from Phase 8, Cat no 47.

Table 47 Types of vessel in Phase 8, all moulded bowls.

Phase	dish	cup	cup or dish	bowl or dish	bowl, plain	bowl, ind	bowl, moulded	ind, moulded	beaker	handled vessel	ind	Total
8							4					4

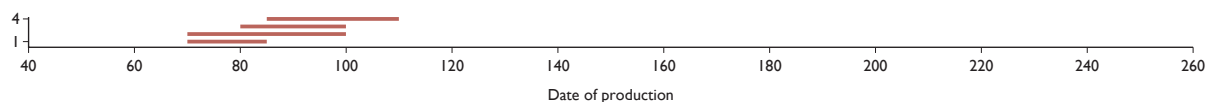


Fig 252 Floating bar diagram showing date-ranges of vessels in Phase 8 (4 vessels).

Table 48 Summary of samian ware in Phase 10.

Phase	Sherds	Vessels (max nos)	EVEs (rim)	Weight	Average sherd-weight	Sherds <1 g
10	70	66	0.80	528.5 g	7.6 g	21

Table 49 Samian forms in Phase 10 (maximum nos of vessels).

Form	SG	CG	EG	Total
18	2			2
18 or 18R	2			2
18R	2			2
18/31		1		1
24	1			1
27	8			8
33		1		1
35	1			1
35 or 36	1			1
36	1			1
Curle 11	1			1
29	1			1
30 or 37	1			1
37	13	2		15
37 or 38		1		1
67	2			2
Hermet 7 or 15b?	1			1
ind	22	1	1	24
Total	59	6	1	66

52 SG dish, form 15/17R or 18R. Stamped [PR]IMIGSV by C. Iulius Primig- Sur- with his die 3a. This die was represented on form 15/17R or 18R at the amphitheatre (Hartley and Morris 1976, 206 dating as Flavian their fig 34.8). This La Graufesenque potter was active AD 90–120 and made many rouletted dishes (*NoTS* 2009, vol 4, 353). This dish does not look especially late, and La Graufesenque's exports to Britain are generally considered to have ended by *c* AD

110. 42% of footring at diameter 10 cm survives, little worn, if at all; weight 101 g. B (2457); SF 9646. *c* AD 90–110.

SG dish, form 18. Fragment of stamp, reading ..] O or O[. 22% of little worn footring, at diameter 8 cm; weight 51 g. B (2457); SF 9876. *c* AD 70–100.

Enclosed vessels

54 SG handled vessel: only the lower part of a finely made handle survives, with glossy, brown-red surfaces. It is flat (rectangular) in section, 40 mm long, 4.5 mm thick, with its width tapering slightly from *c* 16 mm to 13 mm. It has a similar ergonomic shape to that of the modern mug-handle, but its cross-section resembles that of at least one *lagna* (*Musée de Millau, A33 G71 2*; Peter Webster, personal archive). It represents either a small *lagna*, Hermet form 15b, or a large double-handled jar/beaker of Hermet form 7 (Hermet 1934, pls 4–5; Webster 2006, 23, fig 4 and 26, fig 5); Vernhet (1986, 97) included a variant, Hermet 7/15. Weight 6 g. B (2457). Late-Neronian or early-Flavian?

55 SG beaker, Déchelette form 67; wallsherd with an external groove above the decoration and a broad internal groove; weight 3 g. B (2457). *c* AD 70–110.

56 SG beaker, form 67; brownish red-slipped fragment with a broad external groove. Weight <1 g. B (2457) Sa <4379>. *c* AD 70–110.

Selected moulded bowls

57 SG form 37, closely related to form 29: basal wreath of leaf-and-bud motifs, indistinctly impressed below blurred decoration: a winged figure, eagle if not Victory (*CC* Ab.49 and Mees 2014, VIC 007). The worn footring has been smoothed and a hole worked below the decoration; see details below. Weight 70 g. B (2607); SF 10103. *c* AD 70–85. Fig 256

Table 50 Vessel types in Phase 10 (maximum nos).

Phase	dish	cup	cup or dish	bowl or dish	bowl, plain	bowl, ind	bowl, moulded	ind, moulded	beaker	handled vessel	ind	Total
10	8	12	1		1	2	18		2	1	21	66

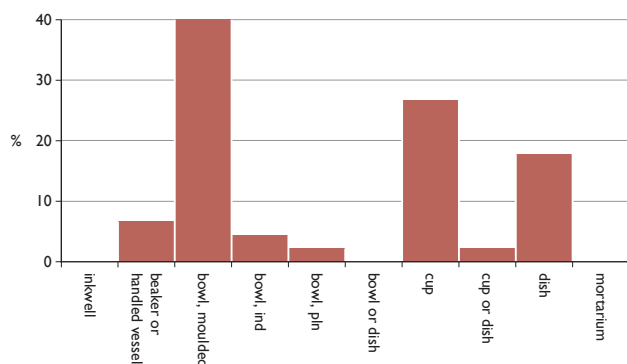


Fig 254 Proportions of vessel types in Phase 10 (45 vessels, maximum nos, excluding indeterminate types).

- 58 Presumably SG and form 37, but thin-walled vessel and, unlike standard La Graufesenque wares, in a dark orangey red-slipped, highly-fired red fabric with few visible inclusions. Here, dolphin (Osw 2399: broken tail and fin, only), Pan (indistinct but in high relief: Mees 2014, PAN 009 or 0010) and bifid garland indicate South Gaul and Germanus i (Knorr 1912, Taf 15.1–8), whose dolphin occurred on a bowl in Chester's western *canabae* (Ward, M 2012b, 56–7 no 14). Dolphins and bifid garlands combined on an unusual bowl at Rottenburg, lacking an ovolo, but ascribed to Germanus (Knorr 1910, Taf 2.1), while other combinations of all the figures and motifs occur elsewhere (Karnitsch 1959, Taf 5.4; Knorr 1952, Taf 29.1 GERMANIF and Hofmann 1988, pl 49.354). Unusually, each bifid constituent of this amphitheatre vessel's garland was based on beads, seen irregularly on form 37 by Germanus i at La Graufesenque (RGZM Ser No 0004835). His activity has been dated AD 65–90 there and at Le Rozier, but AD 90–130 at Banassac (NoTS 2009, vol 4, 196). This vessel was probably a La Graufesenque product, but its fabric is odd. Weight

6 g. B (2457), Sa <4361>; SF 10061. Flavian? Fig 256

- 59 CG form 37. Abraded decoration, blurred and indistinct, below ovolo Rogers B103, used by various Antonine potters at Lezoux, including P-19 (AD 140–160), Divixtus (AD 145/50–175) and mid- to late-Antonine potters (eg Advocisus). Weight 7 g. C (3090). Antonine; probably c AD 150–190.

Plain ware

- 60 EG, indeterminate form; a battered fragment, lacking most of its glossy dark red surface on a very hard but slightly micaceous, buff fabric, resembling some Trier ware of the Antonine period: perhaps a product of Werkstatt I or II and, if so, probably early-Antonine. Weight 1 g. C (3152). c AD 140–160?

Evidence of re-working

- (57) See Cat no 57. SG form 37. The worn footring has been partially smoothed to balance it and below the decoration is a hole, which might have been considered repair-work, but appeared too large at 7 mm across. Weight 70 g. B (2607); SF 10103. c AD 70–85. Fig 256

Phase 11. Robbing of amphitheatre walls

The robbing of the walls of the amphitheatre took place in two phases (Phases 11a and 11b, Volume 2). Samian finds from the fills of robbing trenches derived from the disturbance of stratified deposits through which the robber trenches cut, are summarised in Tables 51–53 and Figs 257–259.

Phase 11a

Stamped vessels

- 61 SG cup, form 27; a very small vessel, whose ungrooved footring appears little worn if at all.

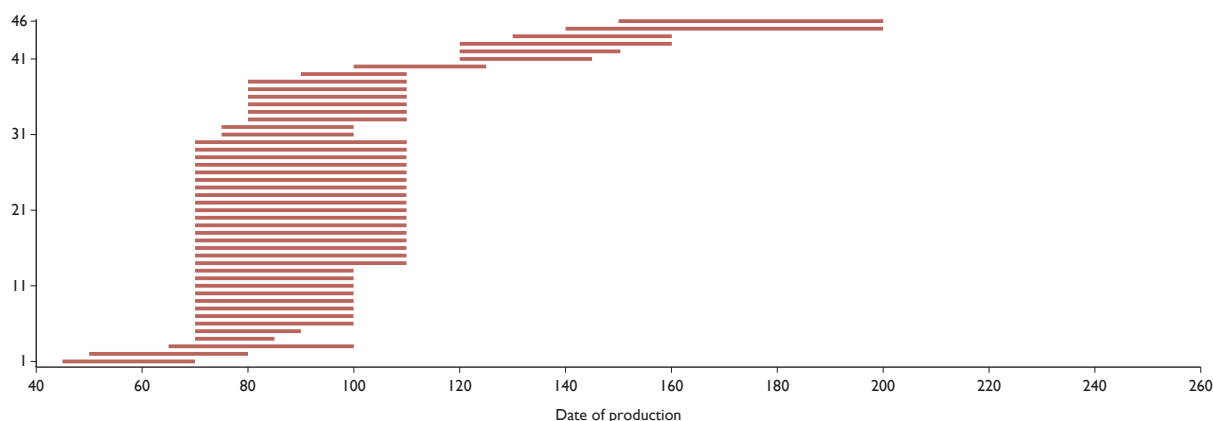


Fig 255 Floating bar diagram showing date-ranges of vessels in Phase 10 (maximum nos of vessels, excluding scraps: 46).

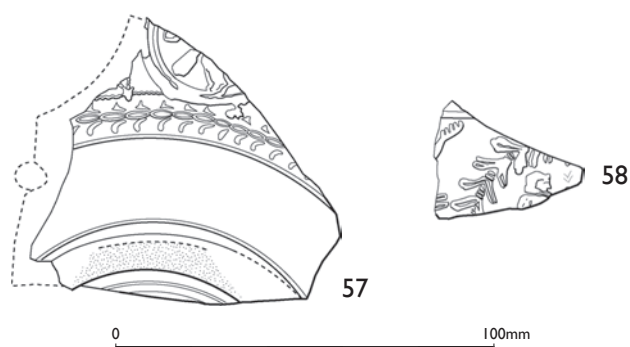


Fig 256 Samian pottery from Phase 10, Cat nos 57, 58.

Three vertical strokes survive from terminal lettering of the stamp. 40% of footring at 3 cm; weight 4 g. A (442); SF 9866. Later-Neronian or early-Flavian, but probably *c* AD 70–85/90.

- 62 SG cup, form 27 g, stamped with illegible, seemingly random lettering (by a previously so-called ‘illiterate’) potter at La Graufesenque in the Flavian-earlier Trajanic period. This base was re-worked; see below. 37% of footring at diameter 5 cm. Weight 20 g. A (244); SF 7320. *c* AD 70–100/110. Fig 260

Selected moulded bowls

- 63 SG form 37. Below a scroll with a 7-petalled rosette and feathery leaf-tips, large leafy motifs favoured in the Flavian period (*CC* Ec.12) compose a basal wreath, as on bowls of the period AD 75/85–110 by M. Crestio (eg at Vindolanda; RGZM Ser No 2004910) and Crucuro i (Mees 1995, Taf 44.1 and 52.1). Weight 37 g. A (485); Phase 11a, fill; SF 10038. From the opposite side of the vessel came a larger piece weighing 66 g, found in A (411): Phase 11b, fill, where the footring has its standing surface smoothed down. 23% of foot at diameter 9 cm. *c* AD 70–110, and probably Flavian. Fig 261
- 64 SG form 37; a small, shallow bowl, but not measurable. Indistinct ovolo, thick wavy-line border and composite grass-plant based on *CC* Eb.43, a common Flavian device (Nieto and Puig 2001, 407, no 525). The decoration is heavily encrusted with *opus signinum*. Weight 29 g. A (441). *c* AD 75–100.
- 65 SG form 37. A glossy rimsherd in a highly fired, reddish fabric with conspicuous yellow inclusions.

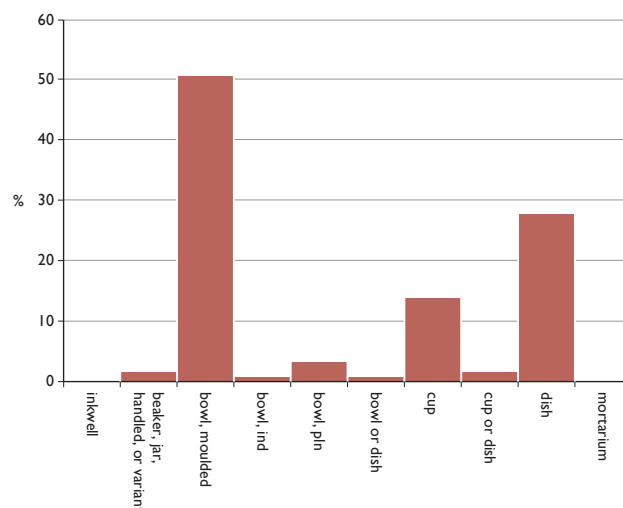


Fig 257 Proportions of vessel types in Phases 11a and 11b combined (124 vessels, maximum nos, excluding indeterminate types).

Panelling with stylised leaf-terminal (RGZM Ser No 2003713 at La Graufesenque). The ovolo is one from La Graufesenque (RGZM Ser No 2004461; ovolo 000058, accessed 17/2/2017), recorded in the Cala Culip wreck, but also at Vindolanda and in Scotland (eg Camelon). The potter appears an eccentric individual, whose range of site-finds may support activity through the mid- to late-Flavian period, see the probably later bowl, Cat no 115. Weight 29 g. A (487); SF 7435. Probably *c* AD 80–100. Fig 261

- 66 SG form 37. Reddish fabric densely packed with large (yellow) calcareous inclusions. Heavily moulded decoration: a basal wreath of hollow bifid leaves (larger than *CC* Ea.42a), below panels with a rosette terminal and including a stylised leaf (*CC* Ca.57); see, from Castleford, Dickinson and Hartley 2000, 34 no 252. Weight 18 g. A (489). *c* AD 80–100/110.
- 67 CG form 37; a product of Les Martres-de-Veyre. Indistinctly moulded decoration: ovolo (Rogers B44) above beadrow (A4), and hound (Osw type 1979). Style of the Potter of the Rosette; (see Stanfield and Simpson pl 23.302). Weight 7 g. A (308). Another fragment from the ovolo, weighing 1 g, was recovered from context A (310). *c* AD 100–120.

Table 51 Summary of samian ware in Phases 11a and 11b (maximum nos of vessels).

Phase	Sherds	Vessels (max nos)	EVEs (rim)	Weight	Average sherd-weight	Sherds <1 g
11a–b	170	157	2.07	1374.5 g	8.1 g	21

Re-worked items

- (62) See above, Cat no 62. SG cup, form 27 g. The footring was hacked off and roughly worked, perhaps for inverted use, with the standing surface

Table 52 Samian forms in Phases 11a and 11b (maximum nos of vessels).

Form	SG	CG	EG	Total
15/17 or 18	5			5
15/17 or 15/17R	3			3
15/17R	1			1
18	3			3
18 or 18/31	3			3
18 or 18R	2			2
18R	9			9
18R or 18/31R	2			2
18/31		1		1
18/31 or 31		1		1
31R		1		1
27	10	2		12
27 or 35	1			1
Form	SG	CG	EG	Total
33	1			1
35	3			3
35 or 36	2			2
36		2		2
C. 11	4			4
29	7			7
29 or 37	1			1
30	2			2
30 or 37		1		1
37	44	7		51
67	1			1
Ritt 13	1			1
Ind	28	9		37
Total	133	24		157

also filed down and/or polished. Weight 20 g. A (244); SF 7320. *c* AD 70–100/110.

*Phase 11b**Stamped and/or plain vessels*

- 68 SG dish, form 15/17 or 18. Stamp ...]OF or OF[...] by a La Graufesenque potter. The dish was made in the late-Neronian or, probably, early-Flavian period. Weight 1 g. B (2518); SF 9877. *c* AD 65/70–90.
- 69 SG cup, form 27 and perhaps 27 g, but the fragmentary footring was only faintly grooved. Unidentifiable basal stamp, probably ...]O rather than C[...] 20% of footring at diameter 5 cm; worn from use.; weight 24 g. A (506); SF 7441. *c* AD 70–100.
- 70 SG cup, form 33a. Stamped SVLPICI by Sulpicius, die 8a (*NoTS* 2011, vol 8, 367), but with SVLP slightly smudged. Die 8a was represented on form 33 at Gloucester, with other dies at Chester including four examples of 8f. This potter's activity at La Graufesenque is dated AD 85–110, in that his work is found on military sites including Chester, with his latest examples from Butzbach, Chesterholm-Vindolanda, Corbridge and the Saalburg (*NoTS* 2011, vol 8, 372). 10% of rim at diameter 12 cm and 100% of worn footring at diameter 5 cm; weight 53 g. A (369); SF 7377. AD 85–110.

Selected moulded vessels, including stamp evidence

- 71 SG form 30. Vegetal decoration as on form 30 from York fortress (RGZM Ser No 1001726; Dickinson 1993, 750, 755 no 2662), with a horizontal wavy line above, but not below, an ovolo frequent on form 30 in the Neronian-earlier Flavian period (Dannell *et al* 1998, 74 fig 1 type FDb, used by Martialis i, Masclus i and the possibly related Masclinus); this is a version whose egg has a broken inner border (RGZM ovolo 000052, when accessed 17/2/2017). Weight 6 g. A (369). Probably *c* AD 60/70–80.
- 72 SG moulded bowl, form 29, with internal basal stamp VI[TALISF] representing die 23b'' of Vitalis ii (*NoTS* 2012, vol 9, 300). Its middle letters were wiped away by the bowl-maker, as on a Vitalis ii bowl at Richborough (Dannell *et al* 2005, vol V, Vitalis ii, G.8, no 1016). Die 23b'' was recorded on form 27 at Manchester; at Augst, die 23b' had been used to stamp form 29.

Table 53 Types of vessel in Phases 11a and 11b (maximum nos).

Phase	Dish	cup	cup or dish	bowl or dish	bowl, plain	bowl, ind	bowl, moulded	ind, moulded	beaker	handled vessel	ind	Total
11 a–b	34	17	2	1	4	1	62	1	2		33	157

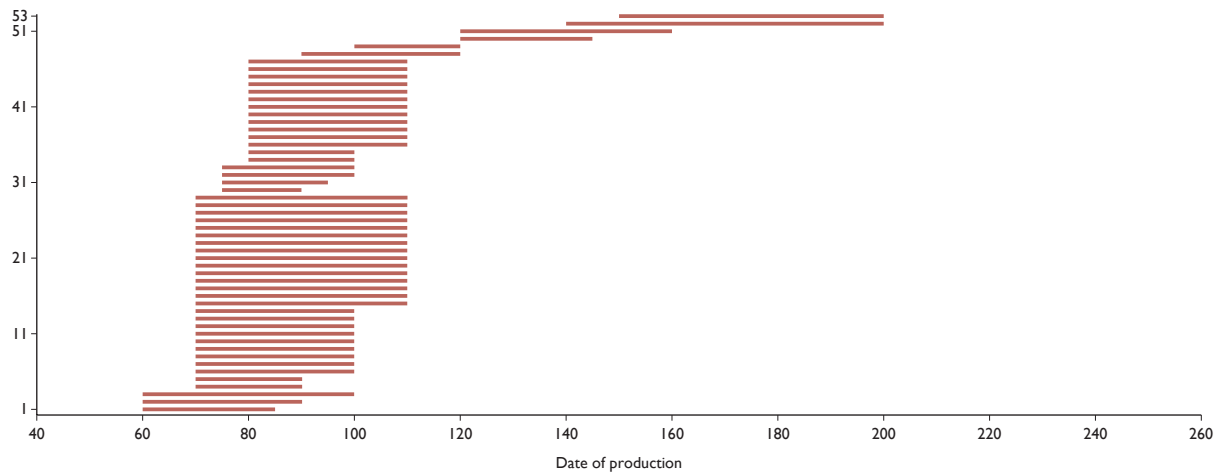


Fig 258 Floating bar diagram showing date-ranges of vessels in Phase 11a (maximum nos of vessels, excluding scraps: 53).

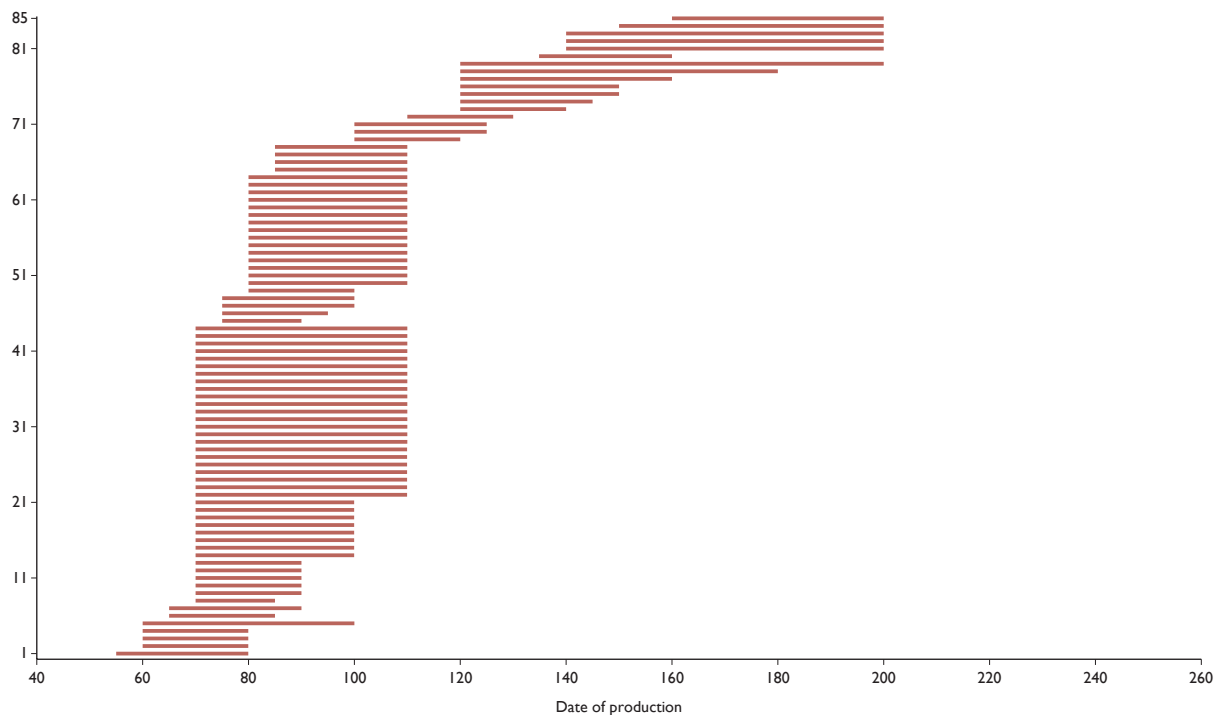


Fig 259 Floating bar diagram showing date-ranges of vessels in Phase 11b (maximum nos of vessels, excluding scraps: 85).



62

0 10mm

Fig 260 Samian stamped vessel from Phase 11a, Cat no 62.

This potter was active AD 70–100, but the bulk of his decorated ware comprised form 29 in the period 70–85 (*NoTS* 2012, vol 9, 319). Only the lower decoration survives: a winding scroll with irregularly 7-spiked rosette (Dannell *et al* 2005,

73

vol V, Taf D2, no 0994 from La Graufesenque). The grooving externally below the decoration and internally around the stamp is similar to that of Polak 1990–1, 65, particularly Group 2, upper variety. 37% of footring at diameter 6 cm; weight 58 g. The footring was unevenly made and its standing surface varies from 5–9 mm; it had therefore been grooved erratically towards the inner edge. For its later improvement, see below. A (410); SF 9865. *c* AD 70–85. Fig 262

SG moulded vessel; rounded and very thin-walled if a ‘small bowl’ of form 37, but its interior was smoothed by the potter and it may not have been

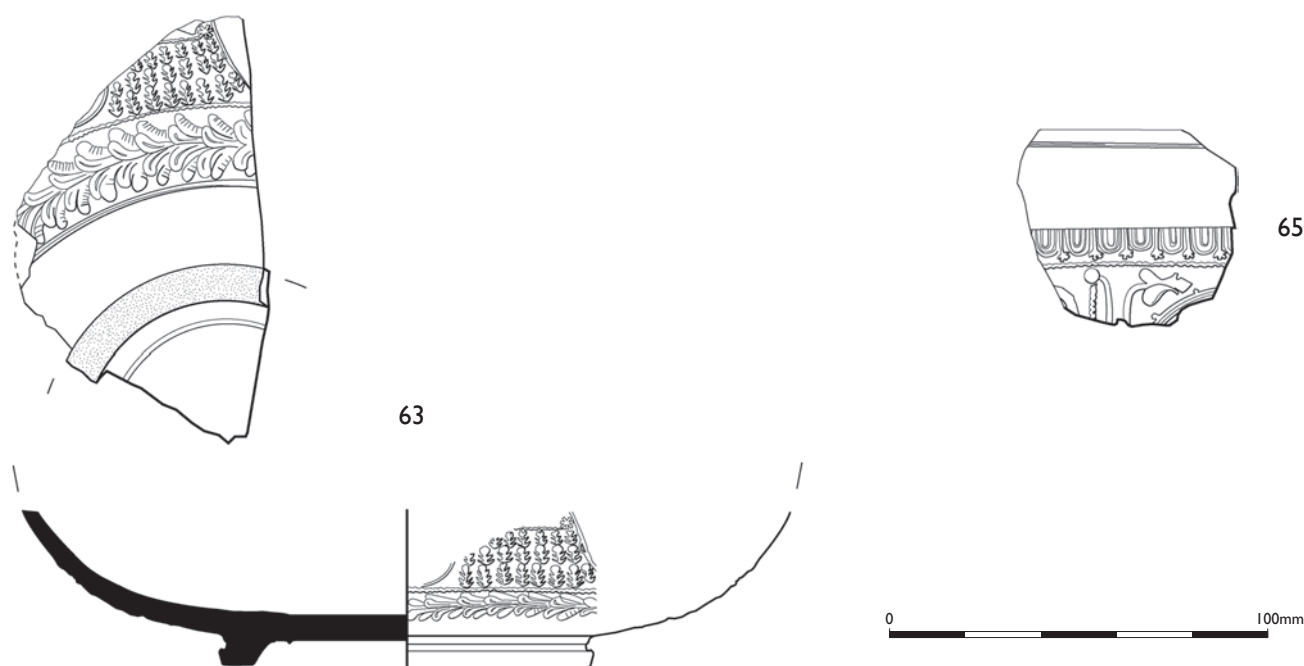


Fig 261 Samian pottery from Phase 11a, Cat nos 63, 65.

a beaker. A neat horizontal wavy-line borders decoration that resembles a stamp reading ...] IO and reminiscent of the style of M. Crestio, a potter who stamped intra-decoratively a variety of moulded vessels (eg *NoTS* 2008, vol 3, 173, die 1a; RGZM Ser No 0004568, form 37). Weight 1 g. B (2565) Sa <4308>. c AD 80–100?

- 74 SG form 37; probably a small bowl, but lacking measurable features. Festoons and wreath of bifid motifs (*CC* Ea.42a), used in the styles of M. Crestio and Crucuro i (Dannell 1999, 49, fig 2.17 no 245 at Colchester). Badly blurred ovolo (RGZM ovolo 000027', when accessed 17/2/2017) was probably a reduced version of type 000027, related to M. Crestio (active in the period AD 80–110). The same composition and this ovolo occurred at Cala Culip (Nieto and Puig 2001, 396, no 498; RGZM Ser No 2007096). Two sherds, weighing 15 g. B (2569); SF 10057. c AD 80–100? Fig 262

- 75 SG form 37, but a variant. An extremely small (cup-sized) bowl with an unusually thick base. Perhaps influenced by Hermet form 9, nonetheless the footring and (here, rather rudimentary) rim were added on, as normal for form 37. For an unusual vessel, it was poorly made. The bowl and perhaps its mould lacked an ovolo; a horizontal wavy line at top was wiped off in places by the bowl-maker. Blurred panels: wavy line-borders with indistinct, draught-like terminals; rather than ring-and-disc motifs, they were probably concentric rings, known in the pre-Flavian period (eg RGZM 0000624, a Colchester bowl form 29, by Labio) and used as terminals on

a Neronian bowl at Middlewich (Ward, M 2016, catalogue D1). Two indistinct gladiators are of general types used at both La Graufesenque and Espalion (Osw 1007, 1008; Tilhard and Bouquillon 2009, pl 8.250–1); Oswald's two were, perhaps significantly, not recorded at Pompeii and appear degraded versions of types found at Cala Culip (*CC* Aa.4 and Aa.16). The Chester gladiators, being closer to Mees's types (2014, GLA-r 009 and GLA-l 002–3), resemble those from La Graufesenque on Crucuro i's Colchester bowl and on a closer parallel bearing ovolo 000036 (RGZM Ser nos 0004605 and 2002389). On Chester's miniature the murmillio carries a round shield, left of a gladiator (with lower legs unclear) holding a rectangular (possibly legionary) shield. Below, a narrow compartment contains small spindles which recur below a gladiatorial pair on form 37 at La Graufesenque (RGZM Ser no 2001816) with that ovolo noted commonly at British sites under Domitianic occupation (RGZM 000035, accessed 17/2/2017). Furthermore, that ovolo and the gladiatorial duo were in Chester's fortress (Ward, M 2008c, 166.2). Flanking the amphitheatre's duo are two vertical items, badly smeared: that to left was beaded; that to right was surmounted by two small rings. Left of the gladiators: indistinctly, if not another sea creature, then a composite grass-plant on a horizontal base (compare Bregenz Kellar's gladiatorial bowl: Jacobs 1913, Taf 3.20). To their right: two distorted cupids (Osw 406, 436; Déch 268, 280) similar to Cala Culip's neater versions (*CC* types Ab.2

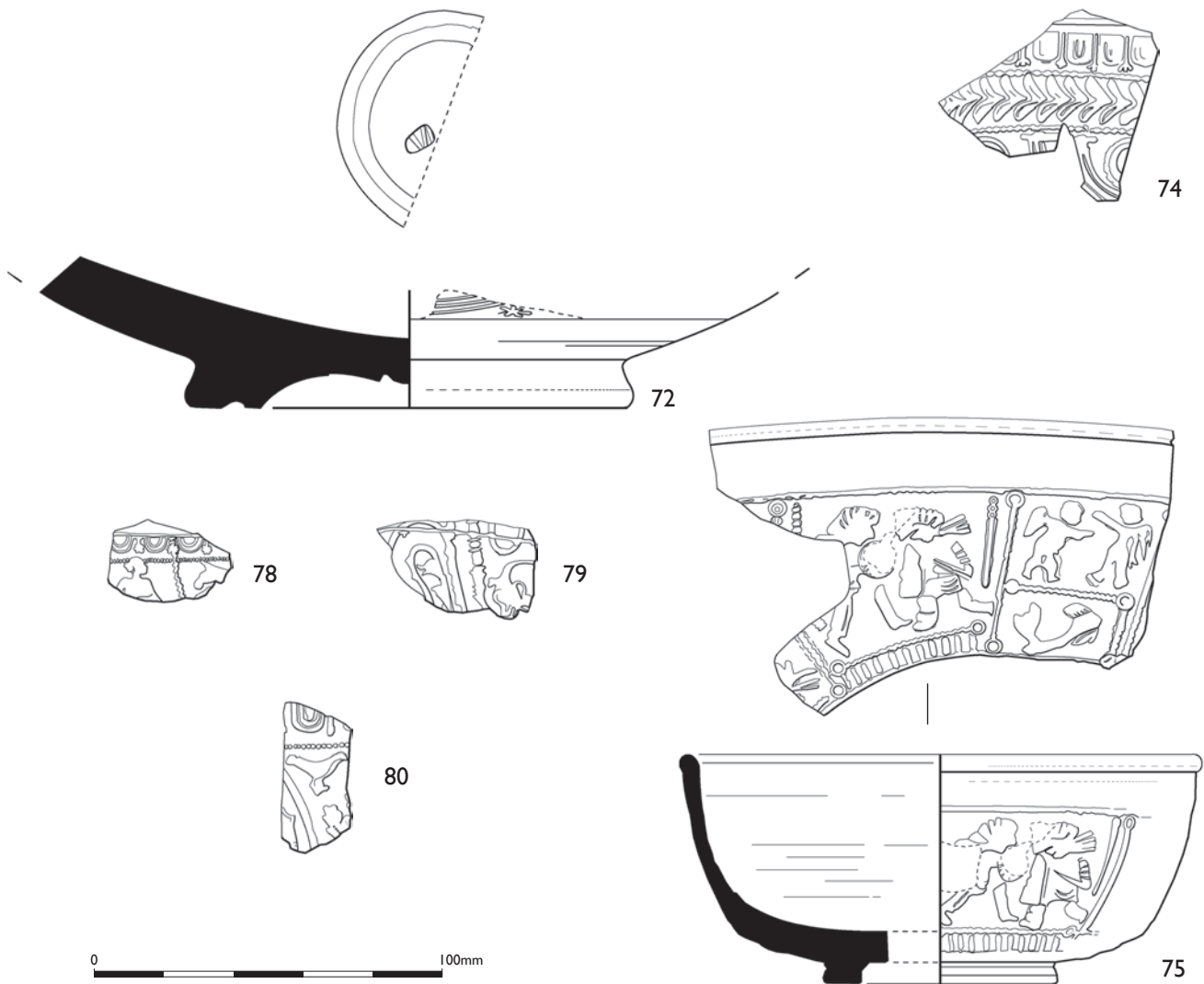


Fig 262 Samian pottery from Phase 11b, Cat nos in range 72–80. NB No 72 is shown at 1:1.

and Ab.14 or Ab.5) recorded in Chester's eastern *canabae* at Love Street (Newstead 1939, pl 23.5). The cupids, verticals and terminals occur very similarly on RGZM Ser no 2002369 with degraded ovolo 000036'. Below the amphitheatre's cupids, a dolphin (Déch 1049) recurring on another Love Street bowl (Newstead 1939, pl 23.2) and, with larger spindles, from the Rhine delta: Polak *et al* 2012, fig 27.13 D8. A similar type occurred at Cala Culip (CC Bh.19) and Pompeii (Dzwiza 2004, type T8.1 Abb 66, form 37): the mould-maker's poinçon thus originated before AD 79. However, the amphitheatre vessel was probably made within the later-Flavian or earlier-Trajanic period, even allowing for the possible work of an apprentice (see p 232). Four sherds, one displaying the complete profile, with its battered footring suggesting little wear from use. 27% of rim at diameter 15 cm; 24% of footring at diameter 7 cm; height 6.6 cm;

weight 117 g. A (411); SF 9742. Probably *c* AD 85–100/110. Figs 231, 262.

76 CG form 37. Below and above a degraded impression of ovolo Rogers B7, indistinct horizontal borders, probably both beaded, suggest a Trajanic product from Les Martres-de-Veyre by Potter X-13. This ovolo occurred on a Middlewich bowl perhaps from the same mould as one at Les Martres ascribed, probably erroneously, to the Potter of the Rosette (Terrisse 1968, pl 19.371 with ovolo badly drawn). Burnt and repaired; see below. Weight 24 g. A (411). Probably Trajanic.

77 CG form 37. Ovolo (probably Rogers B28) above border, A4, and winding scroll with leaf, H170: see Stanfield and Simpson pl 13.167. Style of Drusus i, who worked at Les Martres-de-Veyre. Weight 7 g. A (391). *c* AD 100–125.

78 CG form 37; a small bowl in a highly fired pinkish buff fabric lacking mica, conchoidal in fracture,

with toolmarks on the glossy, slightly orange, interior. Ovolo (Rogers B6) above beadrow (A1); panels with vertical wavy line (A24) and indistinctly moulded figures: Venus (Rogers 1999, type R3047). The sea-horse (Osw 34) occurs in Potter X-12's style at Les Martres-de-Veyre (Terrisse 1968, pl 36.10015, 'IOENALIS'), while ovolo B6, A1 and R3047 point to X-13 (eg Stanfield and Simpson pl 48.576 from Corbridge). Donnaucus, who stamped bowls in X-13's style amongst others, is dated AD 100–120 at Les Martres-de-Veyre (*NoTS* 2008, vol 3, 319), while Rogers (1999, 332) dated X-13 as AD 110–120. The amphitheatre bowl is of uncertain origin; it was a later-Trajanic or early-Hadrianic product, but probably from Les Martres-de-Veyre. Weight 6 g. A (411); SF 10041. *c* AD 110–120/130. Fig 262

- 79 CG form 37; a thick-walled bowl, highly fired and in a fabric not dissimilar to Cat no 78, again lacking mica and again with internal toolmarks, but duller surfaces. Indistinctly moulded, and strongly knife-marked, decoration: astragali (probably R91, used by Geminus iv, Drusus i and ii) adorn a scroll with lotus bud, probably G137 used by Drusus ii: Drusus i formally and ii may have been the same man, working at Les Martres-de-Veyre AD 100–125 and then at Lezoux AD 125–140. Geminus iv was a potter who favoured scrolls, buds and large astragali, and his style was closely associated to Drusus ii (*NoTS* 2009, vol 4, 160). This was an unusual bowl in an unusual ware, but most probably a Hadrianic product. Weight 16 g. A (411); SF 10043. Probably *c* AD 120/125–140. Fig 262

- 80 CG form 37. Ovolo with indistinct tongue (perhaps Rogers B144 rather than B143) and border (A2 or A9); scroll with leaf (H22) and indistinct bird (Osw 2239B). This bird was used by Cinnamus (ii) and his associates from the Hadrianic period onwards and is probably that on a bowl bearing the signature of Cinnamus ii from his early career (Stanfield and Simpson pl 162 no 57; Rogers 1999, pl 29.1; Bulmer 1980a, fig 20), 'excavated by a bomb' and recovered from its crater at Heronbridge (*NoTS* 2008, vol 3, 29): the Heronbridge bowl may have been the earliest of his known moulded work, influenced by early association with Sacer i. Regarding the amphitheatre piece, the poinçon may have been well-used by the time of the bowl's production, but the vessel was also poorly moulded. Weight 6 g. B (2473); SF 10064. *c* AD 135–150/160. Fig 262

Enclosed and plain vessels

- 81 SG beaker, Déchelette form 67 with interior scarcely slipped. Unidentifiable fragment of

moulded decoration with a blurred wavy line, weighing <1 g. B (2562) <4307>. Flavian.

- 82 SG base, identical to that of an inkwell of form Ritterling 13, but with its base slipped and smoothed internally and therefore not a fully enclosed vessel such as an inkwell would be; the interiors of inkwells were often unslipped and were not smoothed (Webster 1996, 72). If the internal flange of an inkwell were omitted by a potter, this might result in a beaker- or cup-like variant resembling form 22 or 23, but more rounded (*cf* form 22B: Stanfield 1929, fig 4.14). Slight 'smoked' spots below the base. Footring a little worn from use: 15% at diameter 8 cm. Weight 8.5 g. B (2481). Flavian.

Evidence of use and repair

- 83 SG cup, form 27. A very small cup whose internal base was thoroughly scoured. 13% of rim at diameter 8 cm. Weight 9 g. B (2563). *c* AD 70/80–110
- (72) See Cat no 72. SG form 29. The footring's standing surface varies from 5–9 mm wide, and part of it was later smoothed down, providing greater stability. 37% of footring at diameter 6 cm; weight 58 g. A (410); SF 9865. *c* AD 70–85. Fig 262
- (76) See Cat no 76. CG form 37. Burnt black outside, badly burnt inside, its fabric now very red. Broken at a rivet-hole, perhaps showing lead traces, drilled through the decoration. Weight 24 g. A (411). Probably Trajanic.

Post Roman Phases 12–21 medieval, post medieval and modern

Residual samian ware in all later phases is summarised in Tables 54–56 and Figs 263, 264.

Potters' stamps

- 84 SG cup of indeterminate form, but probably 35, with a small, chunky foot; the fabric contains both small and very large, calcitic inclusions. The stamp was impressed on a finger-print, but it cannot be illustrated, having been obscured by recent ink-marking. It reads [...]*NASI* and shows elements of dies 2a and 2b used by Cunasus i (see *NoTS* 2008, vol 3, 219, mislabelled). Cunasus i was active AD 55–80 at Montans where he produced cups of indeterminate form alongside dishes and moulded bowls; there is a single British record from London. This Chester cup was probably a contemporary product. Footring little worn: 40% at 3.5 cm; weight 6 g. B (2438); SF 9874. Probably *c* AD 55/60–80.
- 85 SG vessel of uncertain form, with a plain foot, perhaps form 36 or a large form 35, rather

than the highly unusual forms '24/25b' or '24/25c' (Passelac and Vernhet 1993, 573); glossy, brownish red surface on an orange-pink fabric with occasional, tiny calcitic inclusions. Only a fragment survives of letter S[...], if not retrograde and perhaps ¶[... or ¶[.... Forms 36 and 35 bore stamps almost exclusively, but only occasionally, at Montans (Brian Hartley, pers comm; Martin 1986, 68), although Martialis i was one exception at La Graufesenque (Dannell 2011, 61). At Montans, Florus iv was one of the potters who stamped form 36 and whose products reached Britain (Martin 1974, 129; *NoTS* 2009, vol 4, 94, dies 5c, 5d). Slightly burnt. 12% of the worn footring at diameter 8 cm; weight 14 g. B (2455); SF 9875. Later-Neronian or Flavian.

86 SG cup, form 27 g with a short basal stamp, probably IV[...] and representing a La Graufesenque potter such as Iulius ii, active AD 70–90 (see dies 13a, 13c; *NoTS* 2009, vol 4, 331), or Iustus i, active AD 60–85, whose die 12b this resembles (*NoTS* 2009, vol 4, 384). Both Iulius ii and Iustus i are represented by stamps found in Chester and a date within their ranges of activity (AD 60/70–85/90) would cover the possibilities. Worn, but badly battered, footring; 35% at diameter 4 cm; weight 12 g. B (2001); SF 7151. *c* AD 60–90.

87 SG dish, form 15/17 or 18. Fragment of stamp, reading ...]LI and probably representing a La Graufesenque potter working in the late Neronian-early Flavian period. Unworn footring; 27% at diameter 11 cm; weight 28 g. A (1); SF 7114. *c* AD 65–85.

88 SG dish, form 15/17 or, probably, 18. Basal stamp [OFVI]RILI closely similar to, and the same size as, one of Virilis ii's common stamps, die 6c (*NoTS* 2012, vol 9, 270), which was noted at Holt (Dickinson in Ward, M 1998, 67 no 47); however, the end of the frame is squared on the amphitheatre example. The activity of Virilis ii (*c* AD 80–105) suggests a date for this stamp. Four sherds, of which the battered footring seems little worn, if at all; 18% at diameter 11 cm. Weight 35 g. A (224); SF 7358. *c* AD 80–100/105. Fig 265

89 SG cup, form 27 g. Stamped EG[OFE] and representing die 1a of the potter catalogued as Ego (Ego-)? (*NoTS* 2008, vol 3, 346); possibly an abbreviated name, or a joke: 'I made it'. This

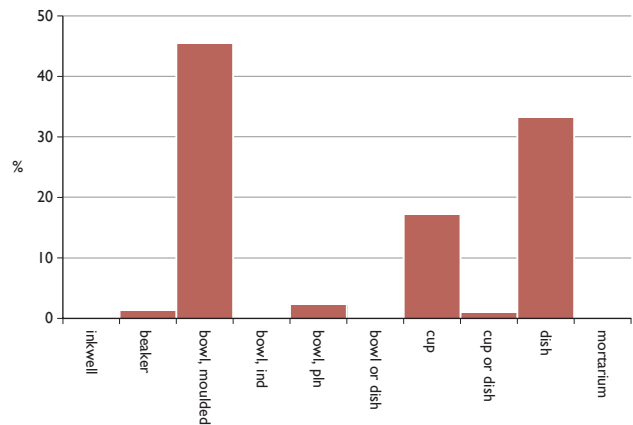


Fig 263 Proportions of vessel types in Phase 12–21 and u/s (484 vessels, maximum nos, excluding indeterminate types).

Table 54 Summary of samian ware in Phases 12–21 and unstratified.

Phase	Sherds	Vessels (max nos)	EVEs (rim)	Weight	Average sherd-weight	No of sherds <1 g
Phases 12–21	671	625	8.80	3717 g	5.5 g	119
u/s	21	19	0.35	129.5 g	6.2 g	3
Total	692	644	9.15	3.847 kg	5.6 g	122

Table 55 Vessel types in Phases 12–21 and unstratified (maximum nos of vessels).

Phase	Dish	cup	cup or dish	bowl or dish	bowl, plain	bowl, ind	bowl, moulded	ind, moulded	beaker	handled vessel	ind	Total
Phases 12–21	155	81	4		11		213		4		156	625
u/s	6	2					7	1	1		3	19
Total	161	83	4		11		220	1	5		159	644

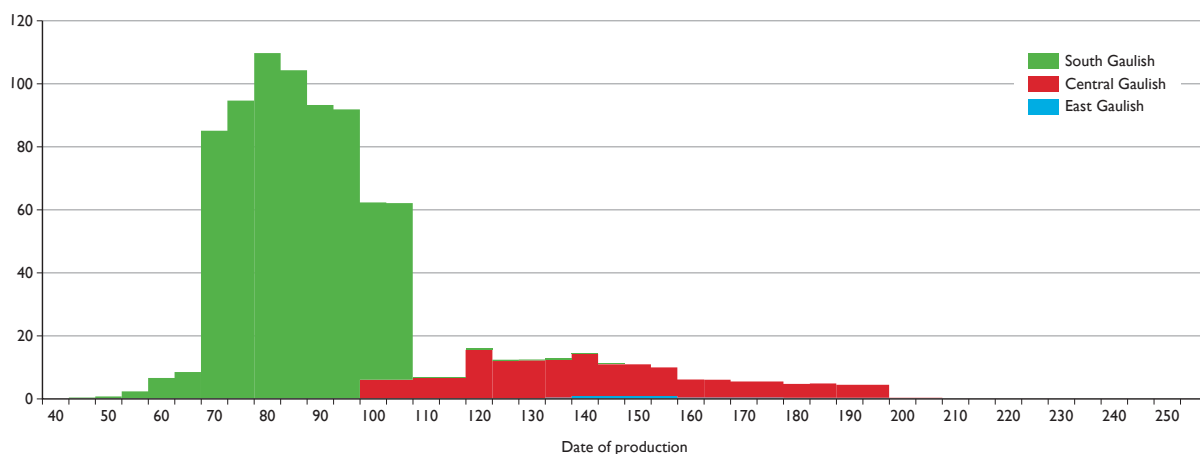


Fig 264 Histogram showing date-ranges per half-decade of all vessels in Phases 12–21 and unstratified material (maximum nos of vessels: 644).

Table 56 Samian forms in Phases 12–21 and unstratified (maximum nos of vessels).

Form	SG	CG	EG	Total	Form	SG	CG	EG	Total
15/17	5			5	27	46	17		63
15/17 or 15/17R	4			4	27 or 35	3	1		4
15/17 or 18	5			5	33		4	1	5
15/17R	2			2	35	7	1		8
15/17R or 18R	1			1	35 or 36	3			3
18	17			17	36	5	1		6
18 or 18R	33			33	Curle 11 or Ritt 12	1			1
18 or 18/31	8			8	C. 11	9			9
18R	27			27	C. 21			1	1
18R or 18/31R	11			11	C. 23		1		1
18/31		9		9	29	17			17
18/31 or 18/31R		1		1	29 or 37	5			5
18/31 or 31		4		4	29, 30 or 37	1			1
18/31R	1	7		8	30	7	1		8
18/31R or 31R		5		5	30 or 37	6			6
31		2		2	37	154	28	1	183
31 or 31R		1		1	67	5			5
31R		2		2	ind	133	39		172
W.79 or 79R		1		1	Total	516	125	3	644

stamp was current within the range AD 80–110, mostly on form 27 and 27 g. Other examples of his work occur at Wroxeter, including die 1a on 27 g, while the broken version, 1a', was found at York. Badly battered footring. For its wear from use and a graffito, see below. Weight 7 g. A (341); SF 9893. *c* AD 80–110.

90 SG 15/17R or 18R. Basal stamp reading

[OFC]O•IV with a slightly swallow-tailed frame ending; die 1a' of Cosius Iucundus, active AD 75–110. This stamp occurred on form 18 or possibly 15/17 at Nicholas St Mews in the western *canabae* (Ward, M 2012b, 117; *NoTS* 2008, vol 3, 130). Stamps from the broken die are more common than unbroken (Cat no 22 in Phase 6). There is no good dating evidence for 1a', though it seems

used much longer than 1a. Hartley and Dickinson recorded 1a at Newstead, and this suggests that 1a' was probably a late-Flavian stamp. They add that the swallow-tail ending reduced with time (*NoTS* 2008, vol 3, 131) and this amphitheatre impression from 1a' indeed displays a slight reduction from 1a'. Together, these factors suggest that this dish was probably produced after *c* AD 90. Weight 5 g. B (2001); SF 7152. *c* AD 90–110.

- 91 CG dish, form 18/31 or (probably) 18/31R. Basal sherd stamped GABRILLI·M with a faint trace of a bar on letter A and with a diagonal stroke preceding the M. One stamp from die 2b by the potter named 'Gabrillus i (M- Gabrillus, M. Gabrillus)', active at Lezoux AD 130–155, is recorded on form 18/31R at Chester (*NoTS* 2009, vol 4, 126; Grosvenor Museum archive: 'no provenance'). The amphitheatre stamp is similar to 2b, which was drawn with A barred, but was unbarred in its transcription (*NoTS* 2009, vol 4, 125). However, the amphitheatre stamp must represent a new die, with four terminal dots distinctly rendered. Weight 13 g. A (26); SF 7141. AD 130–155. Fig 265

- 92 CG cup form 33 of the smaller variety, stamped SEVE[RI·OFF·] with a slight dot at the beginning. The stamp has been sliced, but the lettering, frame and spacing seems to suggest Severus vi, die 12a (or 12a'; see *NoTS* 2011, vol 8, 271) rather than die 3a of Severus v (active AD 125–150). An example of Severus vi's die 3e was noted on form 31R from Chester's civil settlement (*NoTS* 2011, vol 8, 272), but this was a potter active AD 160–210 and, if his work, this amphitheatre cup would be one of his earlier products, as this vessel looks likely to have been made before the late-Antonine period. Weight 9 g. C (3045); SF 8056. A Hadrianic-earlier Antonine cup, probably before *c* AD 170. Fig 265

Plain wares

- 93 SG dish, form 18, with a slight external ledge at the wall/base junction; profile almost complete, lacking the basal stamp. Worn footring. Five sherds: 25% of rim at diameter 16 cm, 43% of footring at diameter 8 cm; height 4.4 cm; weight 109 g. A (95); SF 10047. Probably Flavian. Fig 266
- 94 SG dish, form 36 with an unusually angular rim; orange-red fabric with densely packed calcareous inclusions. Ten adjoining sherds form the complete profile, rim showing the usual leaves *en barbotine*, but also heavy tool-marking. 20% at rim diameter 18 cm; footring little worn if at all (40% at diameter 7 cm); height 4.4 cm; weight 68 g. A (221); SF 10050. Probably *c* AD 80–110. Fig 266

- 95 SG cup, form 27. Rimsherd in a dull brown-slipped, pale and yellow-flecked fabric, probably made at Montans in the early 2nd century rather than a poor, late export from La Graufesenque. 12% at rim diameter 10 cm; weight 3 g. A (78). Probably *c* AD 110/120–150

- 96 SG dish, presumably form 18/31R. A wide, shallow dish with poor, dull brown slip on very pale fabric: probably Montans ware rather than poor Lezoux ware. Rimsherd 5% at diameter 25 cm. Weight 23 g. C (3059). Probably *c* AD 120–150.

- 97 EG cup, form 33. Wallsherd; orange ware typical of Argonne workshops active in the Hadrianic-Antonine (and particularly Antonine). Weight 8 g. C (3045). Probably *c* AD 140–180.

- 98 EG flanged bowl, form Curle 21; a large vessel with rim and wallsherd, lacking its flange and fluting, in orange-pink fabric with a little calcite and mica, strongly resembling La Madeleine ware with its waxy orange finish. However, this form is suggestive rather of the Argonne region (eg Brulet 2012, 156; Chenet and Gaudron 1955, 25 fig 6.15, Pont-des-Remes). Probably an early- to mid-Antonine product and the form may suggest manufacture after *c* AD 150. 8% at rim diameter 20 cm; weight 24 g. C (3068): Post-Roman phase. *c* AD 150–180?

Selected moulded bowls

- 99 SG form 30. Panelling with vertical wavy-line border and bud-like cluster below neat ovolo with rosette-tipped tongue as used by Sabinus iii (Dannell *et al* 1998, 74 fig 1 type FG; RGZM Series No 1000004 with ovolo 000001, accessed 17/2/2017). Sabinus iii was active AD 50–80 (*NoTS* 2011, vol 8, 27). Weight 2 g. A (333). *c* AD 50/55–80.

- 100 SG form 29. Blurred bifid wreath above messy decoration with all spaces infilled: pendants above lion (Dzwiza 2004, type T3.2) over grass strands. See form 29 from Chester fortress (Newstead 1928, pl 2.1), stamped with die 2a or 2b by Rufinus iii, active AD 65–90 (*NoTS* 2011, vol 7, 422). Animals over such strands were common on form 37 made by such potters as M. Crestio (eg Cat no 107). Weight 13 g. A (78); SF 10035. *c* AD 75/80–90. Fig 267



Fig 265 Stamped samian ware from Phases 12–21 Cat nos 88–92.

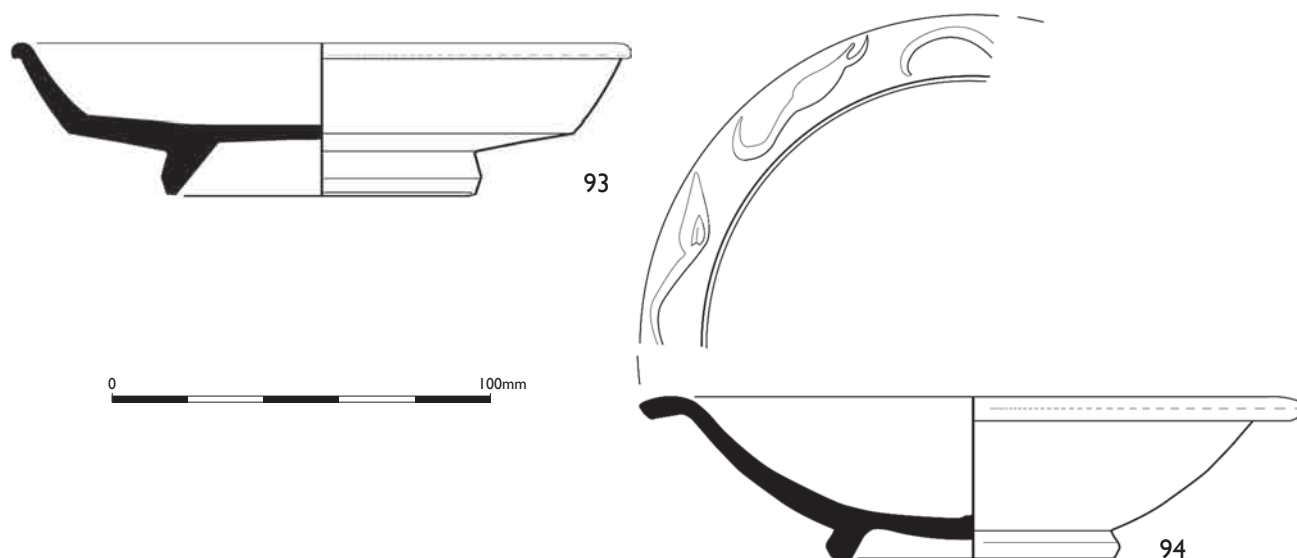


Fig 266 Plain samian ware dishes from Phases 12–21, Cat nos 93, 94.

- 101 SG form 29. Lower zone, smeared on removal from the mould: animals below a wreath of leaf-and-bud motifs, similar to one (again blurred) in the lower zone on M. Crestio's form 29 (RGZM Ser No 000389, London Guildhall). The dog (Osw 2015; *CC* Bd.66) reflects degeneration of a type used on Mommo's form 29 at Pompeii (Dzwiza 2004, Abb 115, T2.15, A12) and was recorded on form 37 at La Graufesenque (RGZM Ser No 2003402 with a common ovolo, 000188, accessed 17/2/2017). It may also be that on bowl form 29 from Foregate Street, Chester (Newstead 1948, pl 5 no 3) stamped with M. Crestio's die 1a (RGZM Ser No 0000387, *NoTS* 2008, vol 3, 173). This is presumed to have been produced in the 80s. Weight 18 g. C (3011); SF 10055. *c* AD 80–90. Fig 267
- 102 SG form 37. Basal wreath of hollow bifid motifs (*CC* Ea.42a) below scroll with small astragaloid ornaments and composite plant with spirals, as on form 29 in Phase 6 (Cat no 25). Gouge-marks in base: see below. Weight 11 g. B (2425). Flavian.
- 103 SG form 37: the footring suggests a small bowl. Basal wreath of bifid motifs in high relief, but untidy. Badly burnt; the footring's standing surface shows little wear: 18% at diameter 7; weight 31 g. B (2425). Flavian.
- 104 SG form 37. Scroll above basal wreath of complex vegetal motifs (*CC* Ed.19), as on a bowl stamped by M. Crestio (Knorr 1952, Taf 19.A) and a Colchester bowl with ovolo used by M. Crestio and Crucuro i (Dannell 1999, 50, fig 2.18 no 263). Weight 9 g. C (3028). Probably *c* AD 75/80–100.
- 105 SG form 37. A fragmentary ovolo, seen with similar decoration at Cala Culip (Nieto and Puig 2001, 389, no 479; RGZM Ser no. 2007073 with ovolo 000119, accessed 17/2/2017). Festoons with similar 'stirrup leaves' (*CC* Cf.15) were often used on form 29, as at the amphitheatre (Hartley and Morris 1976, 203, fig 33.2). For a scoured patch, see details below. Weight 4 g. A (46); Flavian.
- 106 SG form 37. Zonal decoration: composite grass-plant and, over a grass-strand, a lion larger than Osw 1418 and absent from Pompeii or Cala Culip, but present in the Bregenz Keller (Jacobs 1913, Taf 2.12). The quadrifid wreath was noted with another lion, Osw1438 (also in Bregenz Keller) on a small bowl from Chester's eastern *canabae*, nearby at Love St (Newstead 1939, pl 23.5). Weight 23 g. A (46); SF 10034. Flavian, probably after *c* AD 80. Fig 267
- 107 SG form 37. Ovolo (probably RGZM 000029 when accessed 17/2/2017) associated with M. Crestio who was active AD 80–110: badly smudged here and showing a finger-print. Zonal decoration: festoons include a poor 'stirrup leaf'. Above, a furry lion runs amongst common filling motifs including a composite grass plant and grass strands (see also, on form 29, Cat no 100). This lion, again absent from the Pompeii collection, was represented at Cala Culip (*CC* Ba.12) as were all the amphitheatre bowl's decorative elements on unstamped bowls there (eg Nieto and Puig 2001, 406 no 524; 407 no 527). Weight 49 g. A (46); SF 10048. Probably *c* AD 80–100. Fig 267
- 108 SG form 37, but a small bowl, unusually bulbous in profile. Ovolo with quadrifid-tipped tongue used by M Crestio and Crucuro i (RGZM ovolo 000061, when accessed 17/2/2017), probably that recorded previously from the amphitheatre

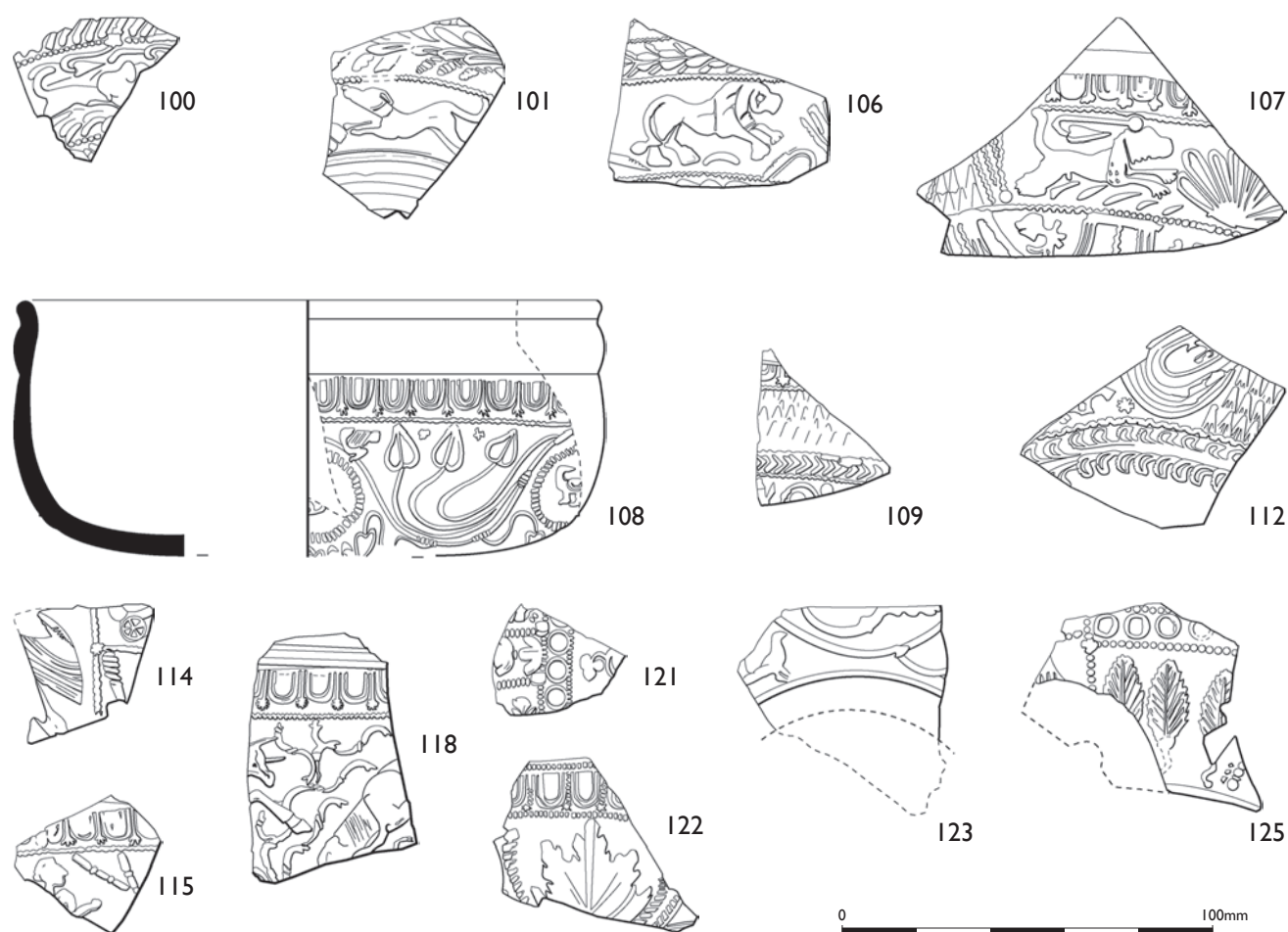


Fig 267 Decorated samian ware from Phases 12–21, Cat nos in range 100–125.

(Hartley and Morris 1976, 203–4, no 8). For the general composition, see Richborough's form 37 (RGZM Ser No 2001586) and Colchester's form 29 (Dannell 1999, fig 2.14 no 207). Below, a scroll ornamented with astragali and two heart-shaped leaves (with and without a central divider). Indistinct rosettes, corded medallions (CC Db.60) and partially impressed arrowheads (RGZM Ser No 2005951) accompany two differently sized geese. The basal wreath of trifold leaves (CC Eb.13a) was used also on form 29, while the ovolo, medallion and large goose (CC Bf.60, lacking a foot) occurred at Cala Culip (Nieto and Puig 2001, 422 no 560). Two adjoining sherds, 14% at rim diameter 15.5 cm; weight 45 g. A (431); SF 10051. A third sherd was unstratified in A (412), weighing 9 g. Flavian, probably before *c* AD 90. Fig 267.

109 SG form 37 in a highly fired red ware with calcareous inclusions (some very large). A very small bowl. Badly smudged zonal decoration, scarcely discernible: ovolo whose tongue has a spikey terminal, above large and badly blurred arrowheads, and an irregular, bifid wreath over

a scroll with bud and rosette. Although bearing resemblance to bowls by M. Crestio (eg RGZM Ser No 0004581, London), the amphitheatre vessel was very poor work and may have been by an apprentice, rather than a late product. Although lacking its rim, it was smaller than Cat no 108 in the same context: perhaps *c* 15 cm at the original rim diameter. Weight 7 g. A (431); SF 10045. *c* AD 80–100/110. Fig 267.

110 SG form 37, with no ovolo (perhaps wiped off by the bowl's maker or finisher rather than omitted by the mould-maker). At top, a bifid wreath above a scroll with interstice filled by a saltire. All very indistinct: poor work, perhaps by an apprentice. Weight 15 g. A (242). Flavian?

111 SG form 37. Ovolo with trifold-tipped tongue (RGZM ovolo 000062, when accessed 17/2/2017), used by M. Crestio and Crucuro i- active *c* AD 75/80–110 at La Graufesenque. Below a horizontal wavy line, the helmet and rectangular shield of a small gladiator (Osw 1013B); this type, Mees 2014, GLA-I 005, is recorded for potters including Vitalis ii. For this ovolo with a similar gladiator,

- see RGZM Ser Nos 2002472 and 1001783 (London). Weight 2 g. B (2001). Probably *c* AD 75/80–100.
- 112 SG form 37. Scroll with 8-petalled rosette, goose (Osw 2294) and large arrowheads. Above a faint trace of basal line, a distinctive wreath used in styles including those of M. Crestio and Crucuro i (eg RGZM ser No 2005955); it occurs on other bowls at the amphitheatre and elsewhere in Chester. This portion probably came from the other side of the bowl to one with identical decoration published as ‘in the vicinity of Pit 13’ and ‘in all probability contained within the seating-bank for the stone amphitheatre’: it was considered typical of the latest SG decorated ware ‘*c* AD 90–115’ (Hartley and Morris 1976, 203–4, no 9). This 1960s’ find was located in ‘SJH Pit 2, bag 528’ in the Grosvenor Museum’s Winsford’s store; Liz Montgomery, pers comm, 2014). The recent find appears to be a Flavian product. Weighing 8 g, a sherd in A (399) adjoins another weighing 17 g in A (401): Post-Roman phase 12 (both contexts); SF 10040. *c* AD 75/80–100. Fig 267
- 113 SG form 37. A saltire now lies left of (fragmentary) Diana and Victory (Mees 2014, DIA 005 and VIC 001) standing above cut-off grass-plants. No basal wreath and poorer work here, but both figures appeared on Cat no 29. The two figure-types were used in the Flavian-earlier Trajanic period, by potters including Mercator i, while the cut-off grass-plant was predominantly popular after *c* AD 80. Diana, grass-plant and saltire were recorded at Middlewich (Ward, M 2008a, 156 fig 88. 70). Weight 10 g. A (74). *c* AD 80–100/110.
- 114 SG form 37; orange-red ware, highly fired, with occasional yellow (calcareous) inclusions, one particularly large. Brenda Dickinson notes (pers comm) a fabric similar to the homogeneous Les Martres-de-Veyre one, but with occasional large yellow-white inclusions, recorded at Augst on a likely Banassac product, a dish stamped by a potter active there in the Hadrianic-early Antonine period (Suarad- in *NoTS* 2011, vol 8, 358–59). Panelling: a twist below a charioteer (Osw 1167), recorded amongst the Bregenz Keller finds (Jacobs 1913, Taf 2 nos 9, 13) with a Banassac ovolo (Hofmann 1988, type D1). To the left, from the Iphigenia cycle one whom Oswald probably considered Pylades rather than Orestes (see Osw 992 and 185A, following the named type 993). The amphitheatre bowl’s drapery above the shield is scarcely discernible and that below is less full: if not a poor impression, this was a variant of Osw 992. Hofmann (1988, pl 4.35) recorded Osw 992 as Banassac type 38 with ovolo A and (pl 33.472) ovolo E1 and stamp by Germanus i, from a die (27a) used at La Graufesenque, but also at Banassac: Germanus was active there AD 90–130 (*NoTS* 2009, vol 4, 196). The Chester bowl’s origin is uncertain; Banassac is possible: Hofmann’s type 38 is closer than Osw 992. Banassac products certainly reached Chester and seemingly the amphitheatre (Ward, M 2016, 145; Cat no 117;). Weight 9 g. A (75); SF 10039. *c* AD 80/90–110/130 Fig 267.
- 115 SG form 37; hard red fabric with conspicuous large calcareous inclusions. Decoration badly blurred and identification uncertain: probably a late export from La Graufesenque. Above a coarse and irregular wavy line, a very indistinct ovolo with four-spiked tip: badly smudged, but probably a narrow-cored type (RGZM ovolo 000058, when accessed 17/2/2017) rather than the hollow-cored Banassac ovolo V (Hofmann 1988, 45, fig 18). Ovolo 000058 having an applied tip to the tongue could account for its being shorter on the amphitheatre bowl. An unidentified, possibly capped, male figure faces untidy ornamentation, apparently astragali (abnormal but not unknown for Banassac; eg Lentinus ii’s Augst bowl RGZM Ser no 0006073). Geoffrey Dannell (pers comm) confirms the existence of La Graufesenque bowls with RGZM ovolo 000058 and festoons suspended by astragali. If the same potter was using this ovolo (seen on Cat no 65) over a long period, his decorative style had become variable and his figure-types unusual (see Bird 2012, 142 on 135 fig 14 nos 1, 3). Weight 9 g. C (3044); SF 10054. Late Flavian or (probably) early Trajanic. Fig 267.
- 116 SG form 37; dullish dark red-slipped red fabric with conspicuously large, yellow calcareous inclusions. A late export: a poor product with blurred decoration: the ovolo’s tongue has a squashed terminal, but appears related to M. Crestio’s (RGZM ovolo 000027’ when accessed, 17/2/2017; Cat nos 30, 74), rather than ovolo 000483 as on bowls stamped by Germanus i at Banassac (RGZM Ser Nos 0006056). Below an indistinct coarse border, a gladiator with crested helmet (Mees 2014, GLA-r 005005: similar, but not identical, to Osw 1020). For ovolo and *thrax*, see La Graufesenque’s RGZM Ser No 2003719. Two adjoining fragments; weight 5 g. A (181). Late 1st or early 2nd century.
- 117 SG form 37; orange-brown slip on a heavily yellow-flecked red fabric. A squarish ovolo with narrow core: squashed horizontally, leaving the tongue indistinguishable, but resembling an ovolo used by Germanus i at Banassac (RGZM 0000483 on Ser no 0006023, accessed 17/2/2017). 8% of rim at diameter 22 cm. Weight 9 g. Area

- A, unstratified. Late 1st or (probably) early 2nd century.
- 118 CG form 30; extremely hard ware, from Les Martres-de-Veyre. Ovolo with spikey rosette-tipped tongue, clearer than Rogers B28 indicates; below, wavy-line border and spindly trees with distinctive horse (Rogers 1999, type R4009) and panther (R4002). The ovolo, trees and horse occur on a London bowl in the style of Potter X-2 (Stanfield and Simpson pl 4.38, Guildhall) and X-2's range includes the panther (Stanfield and Simpson pl 9.118). This style is known in Chester (Stanfield and Simpson pl 8, 98A). Weight 23 g. A (66); SF 10036. *c* AD 100–120. Fig 267
- 119 CG form 37. Ovolo (Rogers B37) and beaded cup (U62), as used in the styles of Igocatus (previously X-4) and Drusus i (X-3), both active at Les Martres-de-Veyre *c* AD 100–120/125. This wavy line (A24) and of U62 adorning festoons indicates Igocatus rather than Drusus i, who preferred beadrows and the cup as a filling motif. For Igocatus, see from Chester, Stanfield and Simpson pl 19.237. Weight 1 g. B (2214). *c* AD 100–120.
- 120 CG form 37. A very small bowl from Les Martres-de-Veyre: only the ovolo (Rogers B37) and border (A24) survive. Style of Igocatus. 11% of rim at diameter 15 cm. Weight 11 g. C (3068). *c* AD 100–120.
- 121 CG form 37, an over-fired product of Les Martres-de-Veyre: a small bowl, lacking measurable features. Smudged decoration in shallow relief. Panels: ivy-trailed tree (Rogers Q5) and rings set vertically. Compartments: at bottom, an indistinct leaf-tip (Rogers J122); at top, perhaps an animal's hoof; middle, the recurring leaf-and-bud motif (Rogers 1999, pl 136.2) which appears at top of a motif used by Potter X-6 (Rogers G233). All the motifs on the amphitheatre bowl occur in the style of the Large S Potter at Les Martres-de-Veyre (Romeuf 2001, 348, pl 71); this bowl may well have come from the same mould, but it is a poor product. Rogers (1999, 335) dated the Large S Potter AD 120–145, but he was seemingly influenced by a single example from Newstead and earlier production is possible. Weight 7 g. C (3067): Post-Roman phase; SF 10104. Hadrianic? Fig 267.
- 122 CG form 37; rather orange ware, highly fired and with no visible mica: a small bowl, lacking measurable features. Beadrow (Rogers A2) below and above an ovolo (Rogers B32, originally with a spikey rosette-tipped tongue) used in styles including those of X-5 and X-6. Panels: indistinct beadrow above double festoon, squashed (F13? See Romeuf 2001, pl 71.1), with leaf (Romeuf 2001, pl 72.6). Festoon F13 occurs in styles including X-14 and the Large S Potter's. The beadrow above the ovolo could suggest early origin, but the fabric may indicate Lezoux. Weight 21 g. C (3045); SF 10052. Probably Hadrianic. Fig 267
- 123 CG form 37. A heavy winding scroll with bird (seemingly Osw 2239B) found on Cinnamus ii's early bowl at Heronbridge (see Cat no 80) but also ascribed to the styles of 'Servus III' (Rogers 1999, pl 110, nos 2 and 8) and P-15 (Rogers 1999, pl 128.1–2). It is unclear which of these contemporary potters this bowl represents, but, along with Cinnamus' early group, Servus ii and P-15 were both active AD 140–160 (*NoTS* 2011, vol 8, 238; Rogers 1999, 285). The footring is missing and may have been sliced off intentionally. Weight 28 g. C (3059); SF 10053. *c* AD 140–160. Fig 267
- 124 CG form 37. Ovolo Rogers B223 (with a faint core), representing either the later style of Cinnamus ii, *c* AD 155–175, or the activity of Casurius ii, AD 160–190. For its possible mark of identification, see below. Weight 6 g. B (2346); SF 9963. *c* AD 155–175/190.
- 125 CG form 37. Panelling with beadrows (A3): rows of rings, and of leaves clearer than Rogers J40 as on a bowl stamped intra-decoratively (Stanfield and Simpson pl 133.19; RGZM Ser no 0010603): Casurius ii, active AD 160–190. For its refurbishment, see below. Weight 31 g. B (2353); SF 10060. *c* AD 160–190. Fig 267
- 126 Form 37, of uncertain origin: good, orange-red surfaces on a hard red fabric, yellow-flecked like some Banassac products in the earlier-2nd century, but slightly micaceous. The fabric is almost identical with, though glossier-slipped than, that of a Piercebridge bowl ascribed stylistically to Heiligenberg in the late-Hadrianic to early-Antonine period (Ward, M 2005, 181–2). A thin sherd from the lower wall with a slight chamfer below the decoration (see, concerning Banassac products, Cat no 33) small leaves above the basal line or guide-line. One leaf on a stalk, *c* 6 mm high, is not dissimilar to, but smaller than, that used in Trier's Werkstatt II (Huld-Zetsche 1993, O 131) or Rheinzabern's type Ricken and Fischer 1963, P 39, used in styles including 'Cobnertus III'. Weight 1 g. C (3052). Earlier 2nd century and probably Hadrianic to early-Antonine.'
- Beakers, etc*
- 127 SG beaker, Déchelette form 67 with interior partially unslipped. Neat moulded panelling: vertical wavy-line border including tiny (9- or 10-petalled) rosettes. Weight 3 g. A (339). *c* AD 70–85/90.

- 128 SG beaker, form 67; slipped internally. Fragment of moulded decoration only. Weight 2 g. A (237). *c* AD 70–110.
- 129 SG beaker form 67; red-surfaced orange fabric, slipped internally, grooved externally above the (missing) decoration. Weight 3 g. B (2001). *c* AD 70–110.
- 130 SG beaker, form 67; slipped internally. Fragment from below the decoration. Weight <1 g. Area B, unstratified. *c* AD 70–110.
- 131 SG beaker, form 67; slipped internally. Very neatly moulded leaf, probably in a scroll. Weight 1 g. C (3081). *c* AD 70–85/90.
- 132 SG rounded and thin-walled vessel, similar to beaker form 67, but smoothed internally (see Webster 2006, 16). Moulded scroll with large, stylised leaves including lotus. Weight 6 g. C (3059). Flavian.

Graffiti and other incised marks

- 133 SG vessel, delicate and flat-based, probably dish form 15/17. Scored underneath the base, the ends of two lines converge but do not meet: [...] VI is likelier than IM[...] as Roger Tomlin notes that personal names in *Im-* are very rare and it is probably the end of a personal name in *-uus* in the genitive case, although the numeral VI ('6') is also possible. Weight <1 g. B (2136); SF 9962. Production-date *c* AD 55–75. Table 28.
- 134 SG dish, form 18. Footring (18% at diameter 8 cm); little worn. Scratched on the inner surface of the foot-ring: S[...] as the beginning of the owner's name. Weight 26 g. C (3030); SF 9964. A Flavian product. Table 28.
- 135 SG dish, form 18. Almost complete profile with slightly rounded wall, but lacking the central base and stamp. Rim: 29% at diameter 16.5 cm; footring: 30% at diameter 8 cm; height 4.4 cm; weight 95 g. Roger Tomlin expands further on details (Tomlin 2014, 438) concerning a graffito scratched on the basal exterior above the worn footring, reading BL with B capitalised, not cursive: 'An abbreviated personal name, probably *Blaesus* or *Blandus*. The reading BA is possible, but less likely. Two diagonal strokes meeting more or less at right-angles would be expected for A, but the writer seems to have made a short vertical stroke, then overlaid it with a long diagonal stroke, and added a second short vertical stroke as if to extend the first. He thus achieved a slipshod L, its descender diagonal, not horizontal. This form is very common, but the writer was probably hampered by the foot-ring, which is why graffiti in this position are often inverted in respect to the vessel, since they were then easier to inscribe.' A (46); SF 7425. Dish:

c AD 70/80–110 (probably Flavian). Fig 268, Table 28.

- (89) See Cat no 89. SG cup, form 27 g. Below the base within the footring is a worn band and, scratched on the upper surface of the base, part of two lines which would have crossed. Roger Tomlin notes that although they may have been a letter (perhaps A or V), they were probably a 'cross' (X), a mark of identification. Weight 7 g. A (341); SF 9893. Stamp: AD 80–110. Table 28.

- (124) See Cat no 124. CG bowl, form 37. Neatly and deeply scored on the inner surface is part of a straight line. Roger Tomlin notes that since it is diagonal to the axis of the ovolo, it may be part of a large 'cross' (X), a mark of identification. Weight 6 g. B (2346); SF 9963. *c* AD 155–175/190. Table 28.

- 136 CG dish or platter, form Walters 79 or 79R (no rouletting is visible on this basal sherd): a later-Antonine type of which the more developed, rouletted version was produced at Lezoux no earlier than *c* AD 165 (Brian Hartley, pers comm). The internal floor of this heavy, flat-bottomed dish was originally over 20 cm in diameter and was 17 mm thick where the foot joined. Epigraphist Roger Tomlin comments that the basal interior exhibits short scratches lying at right angles to two parallel lines, deliberately scored 13 mm apart. For its possible function as an abacus (Tomlin 2014, 438–39) or a gaming-board, see Summary (p 239). The internal floor also shows heavy abrasion, some resulting from use, with scrub-marks again at right angles to the main parallel lines. On the exterior, scratched slightly diagonally from the base and in isolation are two small, fine strokes which appear deliberate: 5 and 6 mm long, 5.5 mm apart at maximum distance and meeting at an apex. Tomlin notes: if the 'letter' was scratched from left to right, which is the natural sequence, this looks more like 'open' (unbarred) Λ than V. 'V' might occasionally be the initial letter of the owner's name, perhaps even inverted and read as (unbarred) 'Λ'. However, without altogether excluding 'Λ' or 'V', Tomlin sees the two lines as possibly a mark of identification. The internal surface is burnt almost black and the exterior patchily burnt; its badly burnt fabric lightens to orange-red towards the wall. This irregular piece is 6 cm long and 2.5 cm wide at maximum points; weight 26 gm. A (333); Phase 12; SF 9959. *c* AD 165–200. See also SF Cat No 205. Figs 268, 269. Table 28.

Unusually worn, re-worked and/or repaired material

- (102) SG bowl, form 37; see Cat no 102. The internal

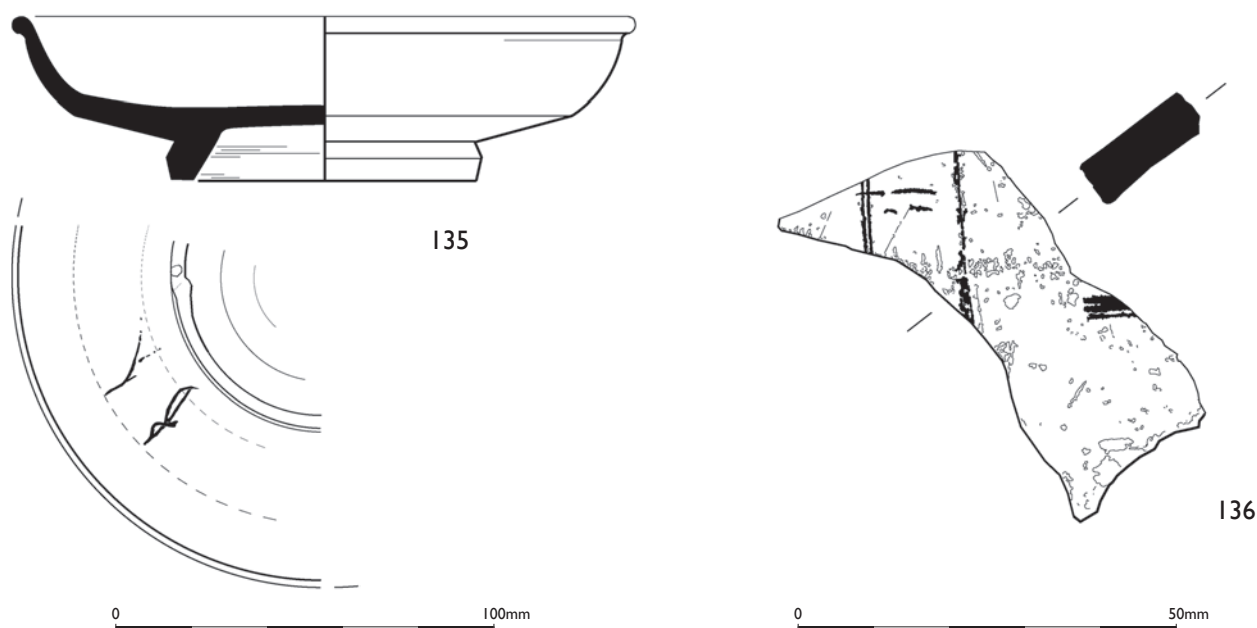


Fig 268 Graffiti on samian ware from Phases 12–21, Cat nos 135 and 136.

surface of the base exhibits small gouge-marks. Weight 11 g. B (2425). Flavian.

- (105) SG bowl, form 37; see Cat no 105. A small patch of surface ($c 8 \times 15$ mm) was purposely scoured on the interior; there is no trace of an erased graffito. Weight 4 g. A (46). Flavian.

- 137 SG cup, form 27 g. A small vessel: two sherds adjoin to form the complete footring, worn from use and removed from the body. The stamp is missing, as the internal base has been filed or ground totally flat. Its secondary function is unclear; it may have been re-used as a stand, or was perhaps inverted for re-use as a miniature receptacle. Some traces of burning may be related to its function. 100% of footring at diameter 3 cm, Weight 10 g. A (139); SF 7238. Flavian.

- 138 SG cup, form 27, cut down roughly at the lower curvature. A basal sherd, weighing 7 g. A (412): unstratified. Flavian.

- 139 SG cup, form 27; lower wall, filed down at the curvature. Weight 3 g. A (1). *c* AD 70–110.

- (125) See Cat no 125. CG bowl form 37. This piece shows odd breakage, both smooth and hackly, with evidence of refurbishment. Below the (missing) ovolo, the edge of the sherd appears at least partially filed down, perhaps to extend the bowl's life in use; however, the filed edge would not have run parallel to the ovolo. Within the decoration is a hole, which might otherwise have been considered repair-work, but it appears too large at 9 mm across and the hole itself shows evidence of smoothing, perhaps to prevent snagging on a rough edge. Weight 31 g. B (2353); SF 10060. *c* AD 160–190. Fig 267.



Fig 269 Possible abacus or gaming board incised on samian base (Cat no 136).

Counters and dishes

- 140 SG dish, form 18R. Derived from the base, this is a very neatly rounded, small counter of diameter 15 mm, now only *c* 2 mm thick. Its external surface has been removed and levelled, flattening the wall/base angle. Weight 1 g. C (3066); SF 8273. Flavian. Fig 313.
- 141 SG, form indeterminate. A very neatly rounded, small counter: diameter 13 mm; *c* 4 mm thick; weight 1 g. C (3059); SF 8218. Flavian. Fig 313.
- 142 SG, form indeterminate. Probably an attempted counter, roughly hewn and incomplete if so:

- 143 diameter 15–16 mm; *c* 5 mm thick; weight 2 g. C (3084) <4549>; SF 9130. *c* AD 70–110. Fig 313. CG dish, form indeterminate. This wallsherd, *c* 9 mm thick, was presumably roughly hewn, forming a large disc or roundel which appears unfinished. Now broken, its diameter was originally *c* 35; weight 12 g. A (1); SF 10046. *c* AD 140–200. Fig 313.

ROMAN FINE AND COARSE POTTERY

By Gillian Dunn

Introduction

A total of 13,093 sherds of Roman pottery (excluding samian) weighing 162,517 g was recovered from the excavation of Areas A, B and C (Table 57).

4,534 sherds (37,558 g) were recovered from Phases of Roman activity. The remaining 8,559 (124,959 g) are from pre-Roman, post-Roman, un-phased and unstratified layers (see Table 58). This gives a relatively low average sherd weight of 8.3 g for pottery from the Roman phases. Hand-collection produced 2,036 sherds (28,656 g) (from Roman phases), the remaining 2,498 sherds, (8,902 g) were recovered from samples.

The size of the assemblages from each Phase is shown in Table 59. It is immediately apparent that almost a third of the whole assemblage (78 % from Roman phases), by sherd count, comes from Phases 5 and 6, ie the use of Amphitheatre 1a and the construction of Amphitheatre 1b,

Table 57 Number of sherds and weight of Roman pottery from the excavation.

Area	No of sherds	Weight (g)
A	5944	74,253
B	5007	62,563
C	2026	24,085
Unstratified (no Area specified)	116	1,616
Total	13,093	162,517

Table 58 Number of sherds and weight of Roman pottery by phase.

	No. of sherds	Weight (g)
Pre-Roman phases	16	51
Roman phases	4534	37,558
Post-Roman phases	8387	122,593
Unphased	156	2315
Total	13,093	162,517

and was recovered from rubbish and cess pits, a widespread occupation layer and the seating bank.

Methodology

The pottery has been recorded by common ware types, and quantified by sherd count and weight for each fabric group and form within each layer (Table 60). Fabrics were recorded with reference to the Chester Roman pottery fabric reference collection. Initial sorting into fabric groups was carried out by eye and using a ×20 magnification binocular

Table 59 Number and weight of sherds by phase.

Phase	No. of sherds	Weight (g)
1, 2 or 3	6	33
2	10	18
3	180	1068
4	17	54
5	1596	12,490
6	1951	16,502
7	661	4714
8	78	571
9	51	2159
10	1577	11,467
11	6	48
11a	571	7663
11b	935	15,957
12	1627	23,098
13	437	6687
14	647	7618
15	1373	26,903
16	504	11,033
17	69	633
18	32	767
19	314	4351
20	204	4101
21	92	2278
Unphased	156	2315
Total	13,093	162,517

Table 60 Roman pottery by ware type, from Roman phases.

Ware type	No sherds	% total	Weight (g)	% total
Fine wares				
South Gaulish samian ware	1044	18.18	6182	13.79
Central Gaulish samian ware	160	2.78	1047	2.33
East Gaulish samian ware	4	0.07	34	0.08
Glazed ware (Holt)	5	0.08	32	0.07
Black-surfaced	16	0.27	16	0.03
Red colour-coated:				
Pompeian Red Ware CNGPR3	15	0.26	62	0.13
Undefined	4	0.07	8	0.01
Black colour-coated:				
Cologne KOL CC	1	0.01	1	0.002
Lyon LYO CC	11	0.19	16	0.03
Undefined	8	0.13	8	0.01
White eggshell (Holt)	24	0.41	24	0.05
Orange mica-coated	82	1.42	287	0.64
Coarse wares				
Black-on-brown	156	2.71	666	1.48
Reduced (local and regional)	1795	31.26	10,810	28.8
Orange:				
Holt HOL OX	64	1.11	1872	5
Wilderspool WIL OX	4	0.07	199	0.5
Severn Valley ware SVW OX2	3	0.05	30	0.08
Regional	1498	26.08	10,352	23.09
White-slipped orange:				
Regional/Wilderspool WIL WS	492	8.56	2964	6.61
Chester	1	0.01	7	0.01
Wilderspool/Wroxeter? WILWS/WRX WS	3	0.05	49	0.1
Black burnished DOR BB1	11	0.19	52	0.11
White wares:				
Radlett-Brockley Hill VER WH	14	0.24	674	1.5
Undefined	57	0.99	487	0.27
Calcite gritted	8	0.13	136	0.3
Grog tempered	3	0.05	33	0.07
Amphorae:				
Cadiz CAD AM1	22	0.38	2238	4.99
South Gaulish GAL AM1	18	0.31	503	1.12
South Spanish BAT AM1	148	2.57	3738	8.34
Tunisian NAF AM2	2	0.03	110	0.24
Undefined	69	1.2	2184	4.87
Total	5742		44821	

microscope where necessary. The fabrics are described by colour, hardness, feel, fracture and inclusions (see Appendix 4). Where applicable, fabrics are also identified according to The National Roman Fabric Reference Collection (NRFRC) (Tomber and Dore 1998). Where vessels cannot be positively identified as coming from a particular centre, the wares have been grouped by firing colour and/or surface finish. Diameters of rims and bases and the percentage present was noted where appropriate. Decoration, stamps, graffiti, condition and cross-joins are also recorded. Form numbers have been attributed where possible, according to the Chester Roman pottery form series.

Pottery supply

The characteristics of the pottery assemblage suggest that there are several local sources as well as regional, national and international imported wares.

A high proportion of the assemblage was typical of the fabrics and vessel forms associated with the legionary pottery and tile production centre at Holt, 12 km south of Chester, on the west bank of the River Dee, conventionally dated between *c* AD 90/100–130 (Grimes 1930). The black-on-brown fabrics and reduced wares (making up 43% of the assemblage by sherd count from Roman phases), are thought to have been made locally, but the precise location of the kilns is unknown. The term ‘Cheshire Plain’ wares is attributed to those oxidised fabrics where undiagnostic sherds are difficult to identify (Williams 1982). Kiln sites of the late 1st and 2nd centuries are also known at Wilderspool, Warrington (Hartley and Webster 1973; Hinchliffe and Williams 1992), Northwich (Hanson 1972), Middlewich and Chester itself (Swan 1984, fiche 1.239–41; Carrington and Ward, T 1982). Pottery from these kilns tended to have a local market, except for Wilderspool mortaria which had a wider market throughout the north-west.

The main traded wares are represented by small percentages of Dorset black burnished wares and oxidised wares from the Severn Valley. The typical sources for the white wares were the *Verulamium* region, Mancetter-Hartshill, Warwickshire, and Oxfordshire. The primary supplier of Romano-British colour-coated wares represented in the assemblage was the Nene Valley.

Continental imports other than samian included north and central Gaulish colour-coated wares, a Terra Nigra-type black-surfaced ware and Pompeian red ware. Imported mortaria are represented by three sherds of a north Gaulish white ware type. The commonest amphora fabric present is that originating from Baetica, southern Spain, but Gallic, Cadiz and north African vessels are also present (Table 60).

Pottery fabrics

For descriptions of the fabrics discussed below, see Appendix 4.

Fine wares

A total of 413 sherds of fine wares (2,020 g) were recovered from the excavations, 166 of which are from Roman phases, (454 g), giving an average sherd weight of 2.7 g and equating to 3.7% by count and 1.2% by weight (Table 60). A range of local fabrics such as white eggshell ware, orange mica-coated and Holt red colour-coated wares are present as well as imported vessels, including black colour-coated Lyon ware and red colour-coated Pompeian red ware. The majority of the assemblage consists of body sherds but despite this a range of vessel forms can be identified.

Glazed ware

Only a small quantity of lead glazed ware is present, typically for Chester assemblages. Five sherds (32 g) were recovered from Roman phases – all from Phase 5 ((625) the widespread occupation layer, and (1216), a cess pit fill). There is also one sherd from a post-Roman phase and one unstratified sherd. They are all in either a hard red/orange fabric or a pale grey fabric with an orange/brown, green/brown or yellow/brown matt glaze. One of the vessels has a possible circle decoration in a yellow glaze. The only identifiable forms are either beakers or bowls, including beaded rimmed bowls (Cat nos 15 and 16, Fig 271). All these vessels are thought to be of Holt manufacture (Chester fabric 204) and this small group of material is a significant addition to the handful of sherds previously recovered from excavations in Chester.

Black-surfaced ware

Twenty-seven sherds (87 g), 16 of which (16 g) are from Roman phases. The majority of these (14 (12 g)) are from samples, which is reflected in the low average sherd weight of 1.0 g. These are Terra-Nigra type wares for which petrological analysis suggests a variety of sources with some, if not all, being continental imports to Chester (Chester fabrics 161, 163, 167 and 203). The assemblage consists mostly of body sherds but lids and a ?beaker can be identified (Cat nos 64 and 65, Fig 275) and a possible Dragendorff 27 samian imitation from a post-Roman phase (Cat no 90, Fig 281) (See Ward, M 1981 for a discussion on this ware).

Red colour-coated wares

Forty-two sherds (311 g), 19 of which (70 g) are from Roman phases. The two dominant fabrics are Holt and Pompeian Red Ware (Chester fabrics 436 and 462), the latter in the form of platters or shallow dishes (eg Cat no 1, Fig 270) from Phase 3. Beakers, dishes and bowls are also present. The condition of the slip is noticeably poor on many of the sherds.

Black colour-coated wares

Seventy-two sherds (121 g), 20 of which (25 g) are from Roman phases. Forms tend to be limited to beakers including roughcast Lyon ware with an everted rim (see

Greene 1979, 24–5 fig 8, type 20.5). There are also examples with white painted decoration and rouletting. One other identifiable form, from A (1216), Phase 5, is a small fragment of the outer edge and wall and part of the discus of a ?Lyon ware lamp (Func Cat no 198). Rhenish, central Gaulish and ?north Gaulish fabrics are also represented but there are no identifiable forms.

White eggshell ware

Forty sherds (43 g) were recovered, 24 (24 g) coming from Roman phases. Vessels include beakers and a straight-sided cup, some with rouletted decoration. All vessels are thought to be the products of the kilns at Holt (Chester fabrics 211 and 475) (see Cat no 38, Fig 273 and Cat no 29, Fig 272).

Orange mica-coated ware

A total of 225 sherds (1,423 g) was recovered from the site, 82 (287 g) from Roman phases, accounting for 1.8 % by count, and 0.8 % by weight from these Phases. All vessels are thought to be the products of the kilns at Holt (Chester fabrics 209 and 467). The vessel forms comprise a range of beakers including indented, beaded-rim, plain rim and everted rim types; plain and flaring rim dishes; bead and flanged and flat-rimmed bowls. Neckless and everted rim jars are also represented (Cat nos 35 and 45, Fig 273).

Coarse wares

Black-on-brown wares

These are locally-produced wares in Chester fabrics 10 and 11 and are amongst the earliest coarse wares from the site, dating to the 1st century. No kiln has yet been discovered for this ware so the source is unknown but considered to be within the Cheshire Plain. A total of 271 sherds (1,673 g) were recovered from the excavations, of which 156 (666 g) are from Roman phases, giving an average sherd weight of just 4.3 g. A limited range of forms have been identified, including everted-rim beakers, plain-rimmed bowls, lids and a variety of jars with everted, square, vertical, triangular and flaring rims. Decoration is limited with just a few examples of incised lines and rouletting.

Reduced wares

These are well-fired grey wares with textures ranging from a fine to a coarse sandy fabric along with some vesicular types. A total of 4,605 sherds (40,215 g) were recovered from the excavation, of which 1,795 sherds, (10,810 g) are from Roman phases. This accounts for 13.7 % of all the pottery recovered, by sherd count and 6.7 % by weight which equates to 39.6 % by sherd count of the pottery from Roman phases, 28.8 % by weight. Two main fabrics are represented, Chester fabrics 193 and 244, both of local origin. The date of the reduced wares is consistently late 1st to early 2nd century.

There is a relatively low average sherd weight of 8.7 g for the whole assemblage, 6.0 g for sherds from Roman phases. A high percentage of the material comprises

indeterminate body sherds but amongst the identifiable forms there are bowls, jars, jugs/flagons, beakers, lids and dishes. Distinction between some large beakers and jars is arbitrary, and similarly between dishes and bowls. Jars are by far the most common vessel form with a wide range of rim types represented, including square- and triangular-rimmed medium-mouthed vessels, wide-mouthed, neckless with a bead rim, everted, flaring, vertical, rounded or rolled, lid-seated and hooked-triangular rims. Decoration includes burnishing, rouletting and rustication.

A relatively small range of bowls is present, the most predominant being those with a reeded or acute-angled rim. Where there is sufficient profile these are either carinated or hemispherical, including possible imitations of samian form Dragendorff 37. Decoration includes rouletting, grooves and inscribed combing. One sherd, from (244) has an unusual horizontal combed decoration, similar to a vessel from Love Street, Chester (Newstead 1939, 91, plate XXVII no 26).

There is a fairly limited range of beakers including everted rim, beaded rim and neckless types with burnished, barbotine and rouletted decoration. Typically for Chester assemblages there are few flagons or jugs in grey ware fabrics but a pinched spout of a jug and a ring-necked flagon with a ribbed handle are present. There is a further 'waster' flagon with an uneven rim in fabric 244 from seating bank deposit (2611).

Square and plain-rimmed lids are well represented along with flat-topped lid knobs. Several examples have sooting on the rim edge and on the underside. There is one mortarium in a misfired white-on-grey fabric (Chester fabric 244) from (1036), a metallised surface, and one sherd of a lamp from post-Roman layer (598) (Func Cat no 131). A complete reduced ware gaming counter was recovered from post-Roman layer (3081), (Func Cat no 203).

The condition of the assemblage is generally good with evidence of burning on some sherds, iron staining and several examples of vitrification. Some of the indeterminate body sherds display other decorative techniques such as circles in relief, shoulder and girth grooves, white barbotine circles, wavy incised lines, roughcast and 'poppy head' decorations (see Grimes 1930, fig 63 no 49).

Orange wares

A total of 4,629 sherds of orange wares (46,874 g) were recovered from the excavations, of which 1,569 sherds (12,453 g) are from Roman phases. This equates to 12 % of all pottery by sherd count, 7.7 % by weight giving an average sherd weight of 10.1 g; and 34.6 % by sherd count from Roman phases, 33.2 % by weight, giving an average sherd weight of 7.9 g – similar quantities to the reduced wares.

The oxidised wares are well-fired and range in texture from a fine fabric to a coarse sandy fabric, including some vesicular types, and range in colour from buff to bright orange to almost red. Fabrics included in this category

are Chester fabrics 151, 152, 154, 194, 215, 512, 537 and mortarium fabrics 139, 531, 532, 536 and 543 (see Appendix 4).

The majority of the oxidised wares are from local Holt and Cheshire Plain kilns and a small percentage are attributed to the Severn Valley kilns. There is a high percentage of indeterminate forms – 28 % by sherd count of all orange wares, 84 % by count from Roman phases; but where forms are identifiable there is a wider range compared to the reduced wares. These include beakers, bowls, dishes, flagons/jugs, jars, lids, strainers, tankards, counters, a lamp, mortaria and tazze.

Beakers include those with everted, beaded, square and vertical rims, as well as globular beakers (Cat no 27, Fig 272), and neckless types (Hinchliffe and Williams 1992, fig 22 no 50; fig 26 no 131 and fig 38 no 341). Decoration includes shoulder grooves, bands of burnishing, barbotine stripes and roughcast.

Bowls and dishes make up 7 % of the assemblage by count, 18 % by weight and include imitation samian form Dragendorff 38, plain- and flat-rimmed forms, some of which are carinated (*cf* Grimes 1930 fig 65, no 82). There are also reeded, acute-angled as well as bead and flanged types (*cf* Grimes 1930 fig 70, no 158). Shallow dishes or platters are also present, some with exterior or interior rilled bases. A more unusual type has a cordon of decoration on a 'flat' rim with knife marks towards the outer edge of the rim (Cat no 83, Fig 280). Decoration includes burnishing, cordons, rouletting and girth grooves.

As with the grey wares there is a wide range of jar types, including those with everted, flaring, beaded, square, lid-seated and pulley-wheel rims. Neckless examples have almost flat, everted or acute-angled rims and amongst the wide-mouthed forms is one with a notched rim similar to one from Wilderspool (Hartley and Webster 1973, fig 4 no 14). Decoration includes shoulder grooves, burnishing, barbotine and roughcast.

The flagons are of the ring-necked type, some with a cordon on the neck. There are one- and two-handled types with either ribbed or bifid handles. A small number of sherds can be identified as jugs including one with a pinched spout, in a Wilderspool fabric but similar to an example from Holt (Grimes 1930, fig 67 no 117).

There are three sherds that derive from perforated vessels or strainers, though one from the Area B seating bank is possibly from a cheese press. One sherd of a tankard in a vesicular Severn Valley ware fabric was recovered from (457) (Chester fabric 215), the robbing of the internal walls in Phase 11a. It has a flat base with a groove on the outer edge.

There are just six sherds of tazze (163 g), some with evidence of burning. They have frilled or pie crust rims and in one case there is notching on the carination.

All of the oxidised mortaria are of the hooked rim type and originate either from Holt, with distinctive quartz trituration grits, or from Wilderspool with mixed grits.

There are two orange ware counters made from the bases of vessels, from Phases 11a and 11b (Func Cat nos 200 and 201), and a fragment of a lamp spout in a fine fabric, also from a post-Roman phase (Func Cat no 129).

The condition of the assemblage is generally good but there are some weathered, chipped or pitted sherds, some with flaking surfaces, sooting or iron adhering to the surface of the vessel.

The date of the oxidised wares is overwhelmingly late 1st to early 2nd century except for 2nd-century Wilderspool mortaria, a residual 2nd-century flanged bowl and a 2nd–3rd-century Severn Valley ware tankard from the seating bank deposits in Area B.

White-slipped orange wares

Amongst the oxidised wares are those vessels covered with a thin white slip. The vessels are either the products of Holt and the Cheshire Plain, but more commonly, the kilns at Wilderspool. The fabrics vary in colour from pale brown and orange/brown to bright orange and in some cases are nearer to red than orange, many having a reduced core. Fabrics recorded here are Chester fabrics 106, 199 and mortarium fabric 528 (see Appendix 4). A total of 1,488 sherds (12,679 g) was recovered from the excavation, 496 of which, (3,020 g) are from Roman phases, meaning that 11.0 % by sherd count and 8.0 % by weight of the pottery from Roman phases is classified as white-slipped orange ware, with an average sherd weight of 6.1 g.

A large proportion of the assemblage comprises fragmentary body sherds which cannot be identified to a particular vessel form. Of those that can be identified, the majority are flagons, typical of those from other Chester assemblages, with jars and bowls being much less common compared to those in reduced or plain oxidised fabrics. The flagons tend to be ring-necked types with ribbed handles, though square, pulley-wheel and vertical-rimmed examples are also present. Bowls and dishes tend to be of the plain-rimmed type. Some have rouletted decoration and a hemispherical bowl from (555) is similar to the samian form Dragendorff 37, with beading below the rim (Cat no 61, Fig 275) (see also Jones 1972, fig 11 no 16; Hinchliffe and Williams 1992, fig 30 no 208; Leary 2008, fig 58 no 100 though the last two are in a reduced fabric).

There are just 19 sherds of mortaria in this fabric, (960 g), 5 of which, (154 g), are from Roman phases, the majority coming from the Wilderspool kilns in a coarse sandy fabric with a grey core (Chester fabric 528, NRRFC code WIL WS). All are hooked rim types with mixed trituration grits. There is one complete spout (*cf* an example from Wilderspool, Hartley and Webster 1973, fig 10 no 80). The other vessel forms represented include two sherds from lids and one of a jug, from post-Roman layers.

Decoration on the white-slipped orange wares is limited to rouletting, shoulder grooves, incised lines and some rilling. There is one example of graffiti, on a sherd from (459) from Phase 11a (Cat no 68, Fig 276).

The condition is generally good though there are sherds with abraded slip, powdery and flaking surfaces, and sandy or iron accretions. Some also display signs of burning.

The majority of the white-slipped wares are dated to the 1st and 2nd centuries.

Black burnished ware (Dorset BB1)

Of the non-local coarse ware fabrics, there are 467 sherds of Dorset BB1 (3,526 g) from the Wareham-Poole area of south-east Dorset (Chester fabric no 19, NFRFC code DOR BB1), of which only eleven sherds (52 g) are from Phases 3 to 9. A high percentage of all the BB1 – 51 % by sherd count and 33.2 % by weight are from Phases 10, 11a and 11b.

A high proportion of the assemblage cannot be identified to form, but there are sherds from flat- and plain-rimmed dishes, jars, beakers, bowls, a lid and a jug with vertically burnished lines. Some of the jars have a white limescale type of deposit on the internal surface, suggesting that they have been used for cooking. Unfortunately, few can give a more precise date than post AD 120 (but see caveat on p 158). Material dated to later than the 2nd century does not appear until Phase 10 (Amphitheatre 2) where there are 3rd- and 4th-century jars and a plain-rimmed dish from (3093), the fill of one of the small shallow pits in Area C (cf Gillam 1976, nos 10 and 81); and Phase 11b where a 3rd-century flanged bowl was recovered from (2579) (see Gillam 1976, no 43 or 44), the fill of a robber trench. There is also a small group of 3rd–4th-century dishes and bowls from post-Roman cultivation soils and the backfill of previous excavation trenches. There is one BB1 gaming counter from a post-Roman layer in Area C (Func Cat no 202).

White wares

A total of 246 sherds of white wares (4,018 g) was recovered, 71 of which, (1,161 g) are from Roman phases. This equates to only 1.7 % by sherd count and 3.1 % by weight of the assemblage from Roman phases. The fabrics present are 17, 137, 138, 196, 213, 469 and 757 (see Appendix 4). The range of forms includes beakers, bowls, flagons/jugs, jars and lids but the highest proportion are mortaria.

The beakers, all from Roman phases and all with everted rims are in a fine fabric and have traces of a barbotine decoration of orange circles (eg Cat no 2, Fig 270). These are similar to vessels from the Deanery Field excavations in Chester (Newstead 1928, Pl XIII, no 11a). All the bowls are from post-Roman phases and include a hooked rim form in a *Verulamium* region fabric and one with a triangular rim. There are only six sherds definitely attributable to jars including a neckless form with a lid-seated rim and scratched lattice decoration.

The mortaria are from three sources – *Verulamium* region, Mancetter-Hartshill and Oxfordshire. The *Verulamium* examples are of the hooked and beaded type, some in a

pinkish fabric with flint trituration grits (eg Cat no 50, Fig 274). Both hooked and hammerhead forms are represented in Mancetter-Hartshill fabrics, with black and red grits, including one example with orange painted decoration on the rim. The Oxfordshire types have either a hooked rim or a rolled rim with a bead.

The date of the white wares ranges from the 1st to the 4th centuries with the later forms, in particular the Mancetter-Hartshill and Oxfordshire vessels of the 3rd and 4th centuries, coming from post-Roman phases.

Shell-tempered ware

The shell-tempered wares which, along with Oxfordshire and Lower Nene Valley wares signify a 4th-century date, thus extending the date range of the whole assemblage, are represented by just ten sherds (64 g) from the site as a whole, all of which are from post-Roman phases. All are body sherds except for the rim of a lid-seated jar from (2491) (Cat no 69, Fig 276).

Calcite-gritted ware

Nine sherds (137 g) of this black vesicular, calcareous pottery (Chester fabric 791) of unknown source, were recovered from the cultivation soil of Phase 2 and the timber slots in Phase 6. There are some sherd links between the contexts in which they were found but it is probable that all the sherds are from the same vessel – an everted-rim bowl decorated with incised diagonal lines. It is suggested that they were redeposited when timber slots were created for the timber-framed seating structure in Phase 6 (Cat no 37, Fig 273).

Grog-tempered ware

Three body sherds (33 g) in a black/grey hard hand-made fabric of unknown source (Chester fabric 793), were recovered from the seating bank deposits in Phase 6 (Area B). This fabric has a broad date of Late Iron Age–early Roman.

Vessel forms

A diverse range of forms is present in the assemblage – storage vessels, food preparation and serving vessels, those used for food and drink consumption as well as more specialised forms such as lamps and tazze (see pottery fabrics section above).

The number of mortaria represented in the assemblage is noticeably low with just twenty-two sherds (1,824 g) from Roman phases – equating to just 0.5 % by sherd count and 4.9 % by weight. Subsequently there is a fairly limited source for these vessels, including Holt (oxidised), Wilderspool (oxidised including white-slipped orange), *Verulamium* region (white ware), Cheshire Plain (oxidised) Mancetter-Hartshill (white ware) and Chester/Foregate Street. Just one example of a north Gaulish fabric is represented (Chester fabric 148). Where rims are present

they are all hooked rim forms and all reflect a date of the 1st and 2nd centuries. There is a noticeable absence of vessels from the Crambeck and Nene Valley kilns with just one sherd from the Oxfordshire kilns. The later Roman hammerhead forms from Mancetter-Hartshill, only occur in Post-Roman phases. None of the vessels display any potter's stamps.

Amphorae account for 5.6 % by sherd count and 23.1 % by weight of the pottery from Roman phases, amounting to 256 sherds (8,679 g). The assemblage is dominated by the southern Spanish Dressel 20 form (Peacock and Williams class 25) in Chester fabric 145 and the south Gaulish flat-bottomed wine amphorae (Peacock and Williams class 27) in Chester fabric 142, which together amount to 65 % by sherd count and 58 % by weight of the total assemblage of amphorae. The limited number of rims, however, means that these can only be broadly dated from the 1st to 3rd centuries, the exceptions being a Dressel 20 from (2498), a seating bank deposit – though the body sherds are flaking and burnt, the rim is in a good condition and suggests a date of AD 100–200 (Peacock and Williams 1986, fig 66 no 27); and from (369) (Phase 11b) where the rim is dated to the 2nd to 3rd century. Other amphorae include those that originate from the Cadiz region (Peacock and Williams class 17) in Chester fabric 1, thought to have been containers for fish sauce, in circulation around the late 1st to early 2nd century. There is also one example of a north African form from (2461), the seating bank in Area B (Peacock and Williams class 33/34) in Chester fabric 792 (Cat no 57, Fig 274). These too were used for transporting fish products as well as olive oil. Sherds of possible Camulodunum 189 amphorae, probably used for the transport of dried fruit from the south-east Mediterranean and dating to the mid-late 1st century were recovered from Phases 3 and 6 (Chester fabric 769). Dressel 2–4 wine amphorae (Peacock and Williams class 10), in an orange fabric with an abraded white slip came from (322), the fill of a robber trench in Phase 11a. Six fragments of amphorae lids were recovered from Roman phases, in a fine buff fabric similar to Gallic wine amphorae. There is only one example of an amphora stamp, from a Post-Roman Phase, where there is just a faint trace of a letter S (Cat no 81).

Roman pottery from post-Roman phases

All residual Roman pottery from post-Roman phases of activity was recorded to the same level as the Roman material. A total of 8,387 sherds (122,593 g) were recovered giving an average sherd weight of 14.6 g (Table 59). Most (80 % by sherd count and 94 % by weight) was recovered by hand collection.

There is a wide range of fabrics and forms and the date range spans from the mid-1st century to the late 4th century. Vessels present that are lacking in the Roman phases include 3rd- and 4th-century mortaria from Phases 13, 14, 16, 17

and 19, and late 2nd–4th-century Dorset BB1 bowls, dishes and jars from Phases 10, 11b, 12 and 15.

The source of the material, in addition to the local wares, includes south Gaulish and Spanish amphorae and north Gaulish mortaria, colour-coated wares from Lyon and Campanian wine amphorae. Traded wares include Dorset BB1, and vessels from Mancetter-Hartshill, *Verulamium*, Oxfordshire and the Severn Valley.

There are a number of vessels recovered from Post-Roman phases that are worthy of note and have been catalogued and illustrated: a fragment of a red colour-coated lamp (Func Cat no 130) and the cornice rim of a black-colour coated Lyon ware roughcast beaker (Cat no 71, Fig 277). Vessels in orange mica-coated ware include a dish/bowl with a 'lid-seated' rim (Cat no 86, Fig 280), a reeded-rim dish/bowl (Cat no 91, Fig 281) and a jar with decorative bosses (Cat no 77, Fig 278). There are also examples of imitation samian forms Dragendorff 31 and Dragendorff 27 in orange mica-coated fabrics, (Cat no 84, Fig 280), a flanged bowl (Cat no 85, Fig 280), a hemispherical bowl and lid-seated bead-rim dish. There is one example of a wine cooler or strainer in a white eggshell fabric (Cat no 73, Fig 277) and an imitation of a samian Dr 27 cup in a black-surfaced fabric (Cat no 90, Fig 281). An example of a 4th-century shell-tempered lid-seated jar was recovered from Phase 11b (Cat no 69, Fig 276), along with mid-2nd-century Dorset BB1 (Cat no 70, Fig 276).

Chronology

The Roman pottery assemblage is chronologically limited and dominated by local coarse wares, primarily oxidised and reduced wares suggesting a date of the late 1st century to the early/middle 2nd century with a negligible amount of pottery later than the late 2nd century. More precise dating of these coarse wares within this late 1st to early 2nd-century period is difficult because the fabrics and forms tend to remain fairly uniform. We therefore see a fairly consistent date for the pottery of later Flavian–Trajanic from all Phases of Roman activity. Where later material has been identified it consists of small groups of residual 3rd- and 4th-century vessels such as shell-tempered ware and Dorset BB1.

Condition

The condition of the fine and coarse ware pottery is, as with the samian, generally good, though there are examples of abraded slip, and weathered, flaking and pitted surfaces. The most extreme cases of weathering have resulted in sherds with a very soft powdery texture. As is to be expected from such a large assemblage there are examples of sooting, evidence of burning and some sherds are encrusted with sandy and iron-like deposits. The only evidence for vessel repair comes from a possible rivet hole in an iron-stained grey ware body sherd from context (374).

Surface treatment, decoration, re-use and stamps

The only example of graffiti from the assemblage of coarse wares is on a white-slipped orange ware body sherd from (459). It consists of an 'X' scored between parallel lines, on the external surface, after firing, (Cat no 68, Fig 276).

There are four examples of re-used coarse ware sherds in the form of gaming pieces or counters, all from post-Roman phases. There are two from the bases of orange ware vessels from (485) and (2472) (Func Cat nos 200, 201); a body sherd of a grey ware vessel (3081) (Func Cat no 203), and the base of a Dorset BB1 vessel (3044) (Func Cat no 202).

Part of a handle from a Dressel 20 oil-amphora from (2297) is the only stamped vessel present in the coarse ware assemblage. It has been impressed before firing with a rectangular stamp. Part of one edge survives, but almost none of the field, which is too abraded to be legible, though there is a possible trace of an S (Cat no 81).

There is a typical range of decorative techniques as would be expected in an assemblage of this size. The most common of these is a white slip. There are also burnished vessels (in addition to Dorset BB1) including burnished lines and lattice decoration on orange wares; rusticated vessels, in particular grey ware beakers and jars; red colour-coated and mica-coated vessels. There are good examples of barbotine decoration including both white and orange circles. Other forms of decoration include roughcast, raised bosses, rouletting, incised lines and some finger wiping.

Falling within the 'accidental' surface treatment category are several sherds with finger impressions and some that have been overfired, including three examples of wasters – an orange ware reeded-rim bowl from (2372), the Phase 6 seating bank (Cat no 43, Fig 273); a grey reeded-rim bowl from (427) post-Roman Phase 12, and an everted rim jar in Chester/Foregate Street fabric (Chester fabric 244) from post-Roman Phase 16, (2294) (Cat no 87, Fig 280).

Roman pottery phase summaries and catalogue

Period 1: pre-Roman

Phase 2

Ten sherds of pottery (18 g) were recovered from the upper cultivation soils between the outer and arena walls of the later Amphitheatre 1 (1201), (1222) and (1288). A limited number of fabrics are represented, but comprise 1st-century black surfaced ware, reduced and oxidised coarse wares and a fine white ware with a painted orange circle decoration. There is also one sherd in a calcite-tempered fabric from (1201) (Chester fabric 791) which suggests a date of early to mid-1st century AD. Although no join is evident this sherd is probably from the same bowl as that from (789), (1031) and (1046) (Cat no 37, Fig 273),

re-deposited when timber slots were created for the timber-framed seating structure in Phase 6. It is suggested that the mid/late 1st–early 2nd-century reduced and oxidised wares are intrusive from Phase 3.

Period 2: Roman occupation before the amphitheatre Phase 3

One hundred and eighty sherds (1,068 g) were recovered from this Phase from the cultivation soils and occupation deposits. Given this quantity it is, perhaps surprising that only 12 sherds (25 g) of samian ware were recovered from these contexts (p 246; Table 32)

Cultivation soils

A small assemblage of 86 sherds (300 g) came from disturbed upper cultivation soil (1123). This comprised mainly local oxidised and reduced wares of indeterminate vessel form, though small fragments of a grey ware flat-rimmed dish or bowl were present. Imported wares are represented by eleven sherds of a red colour coated dish or platter in a Central Gaulish Pompeian red ware fabric (Chester fabric 462, National Roman Fabric Reference Collection (NRFRC) code CNG PR3) with a plain, inturned rim dated to the mid-late 1st century (Cat no 1, Fig 270). The slip is in a fairly good condition on the internal surface but worn on the external surface, with rouletting on the inside of the base.

A second identifiable vessel from this layer is a beaker or jar in a fine white fabric (Chester fabric 196), comprising 10 sherds (9 g). The vessel is in a good condition with barbotine decoration of orange/brown rings (Cat no 2, Fig 270) (*cf* Grimes 1930, fig 63 no 55; Newstead 1928, pl xiii, no 11a) which dates to the late 1st century. Sherds of what is probably the same vessel were also recovered from Phases 4, 6 and 7, though there is only one sherd join (between (635) and (789)). It is also noticeable that sherds of Pompeian red ware from (1123) are comparable to those from some of the same layers from which the white ware beaker/jar was found. This can be explained by the fact that the insertion of the timber-framed seating structure in Phase 6 disturbed the cultivation soils and the dumping deposits associated with the construction of Amphitheatre 1a in Phase 4.

One other vessel of note from the cultivation soils is a possible Camulodunum 189 amphora, a small conical vessel with horizontal rilling, probably used for the transport of dried fruit from the south-east Mediterranean and dated to the mid-late 1st century (Chester fabric 769, NRFRC code PandW AM 12).

Pre-amphitheatre occupation deposits

The sandstone brash layer into which the wheel ruts were cut (1274), produced nine sherds of coarse grey and orange wares (56 g) and includes a flagon, jar, and a possible base fragment of a mortarium in an off-white fabric with a slightly pinkish core.

There were just two sherds of pottery from the orange sand covering the wheel ruts (1107) and the subsequent fill of a beam-slot cut into this sand (1102) – one from a local orange ware vessel and one from a southern Spanish Dressel 20 amphora (Chester fabric 145, NRFRC code BAT AM). The possible occupation layer overlaying this, (1091) produced six sherds of local oxidised and reduced wares, the only identifiable form being a carinated bowl with a reeded rim (Cat no 3, Fig 270). A widespread deposit of sand (1086) produced six sherds of pottery (89 g) – local oxidised and reduced wares, all indeterminate forms except for a grey ware reeded-rim bowl. Layers of trample from this Phase (1126) and (1255) produced 49 sherds (154 g), the majority being local orange, grey and white-slipped orange vessels, mostly weathered with flaking surfaces, chipped sherds and some with evidence of burning and iron/sandy accretions (Cat no 4, Fig 270). The fragmentary nature of the assemblage, the average sherd weight being only 3.1 g, means that vessel forms are difficult to identify. However, a highly-fired jug or flagon with a ribbed handle and orange and grey ware dishes or bowls are present.

The latest context to be cut by the construction trench for the outer wall of Amphitheatre 1, (1082) produced 20 sherds (102 g) of primarily local black-on-brown, oxidised and reduced fabrics including a ?local 2nd-century orange ware hooked-rim mortarium, similar to Chester fabric 543, with a thin white slip. The patch of clay, interpreted as an oven base (1144) produced just one sherd of oxidised ware (5 g).

The imported wares from this Phase, the red colour-coated dish or platter and the amphora date from the mid to late 1st century, with the local coarse wares suggesting a date of late 1st to early 2nd century.

Catalogue

- 1 Plain rim of Pompeian red ware platter or dish. Slip fairly good on internal surface but worn on external. Complete profile. Chester fabric 462. NRFRC code CNG PR3, form 1005. A (1123): Phase 3 cultivation soil; SF 9978. Mid–late 1st century. Fig 270.
- 2 Everted rim of beaker in fine white fabric. Shoulder groove and traces of orange paint. Same as vessels with orange painted circles from Phase 2 A (1288); Phase 4 A (635), Phase 6 A (789) and (1046), and Phase 7 A (787). Chester fabric 196, form 1424. A (1123): Phase 3 cultivation soil; SF 9988. Cf Grimes 1930, Fig 63 no 55; Newstead 1928, Pl XIII no 11a. Late 1st century. Fig 270.
- 3 Rim of a carinated bowl with a reeded rim in coarse grey ware. Evidence of burning and rim damaged. Chester fabric 193, form 1387. A (1091): Phase 3 occupation layer; SF 9995. Late 1st–early 2nd century. Fig 270.

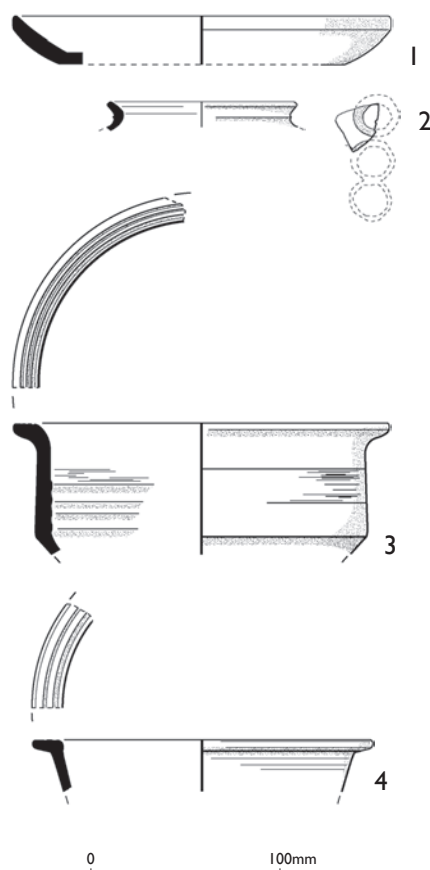


Fig 270 Roman pottery from Phase 3, Cat nos 1–4.

- 4 Dish/bowl. Flat rim in a pale grey/buff fabric. Abraded with iron/sandy accretion on all sherds. Probably the same vessel as Sa <4792>. Very slight traces of orange/brown pigment on the rim. Chester fabric 193, form 802. A (1255): Phase 3 re-deposited sand from arena; SF 10090. Late 1st–early 2nd century. Fig 270.

Period 3: The first Roman amphitheatre

Phase 4. Amphitheatre 1a construction

The re-deposited material dumped against the inner face of the outer wall to form the seating bank produced a small assemblage of seventeen sherds (54 g) and a single samian ware sherd (p 248).

The pottery from (545), (635), (1065), (1071), (1148) and (1172) is fragmentary and abraded giving an average sherd weight of just 3.2 g. There are several cross-joins between vessels found in the upcast forming the seating bank and the upper cultivation soils of Phase 2. In addition to the local oxidised and reduced wares there is a mid-late 1st-century Pompeian Red Ware dish and sherds of a fine white ware beaker with traces of orange slip from (635), also seen in contexts (1288, 1123) of Phases 2 and 3 and

(789) (Phase 6), all reflecting a date of mid-1st to early-2nd century (Fig 270, no 2).

One of the deposits from the excavations carried out in 2001, (M239) in Trench XII, was identified as primary seating bank, associated with this Phase of activity, from which one base and seven body sherds of coarse grey ware (34 g) was recovered. This is consistent with the dating for Area A.

Phase 5. Amphitheatre 1a use

This phase produced 1,596 sherds (12,490 g) of fine and coarse pottery to which should be added 118 sherds (292 g) of South Gaulish samian ware (p 248; Table 37).

Immediately outside the wall of the amphitheatre the earliest deposit of this Phase, a (1075), produced 110 sherds (824 g), 78 % of which, by sherd count, was recovered from samples, resulting in very small sherds. The average sherd weight of 7.5 g gives a false impression of the character of the assemblage as in this case one particularly large amphora sherd weighs 411 g. The assemblage is dominated by locally-produced coarse wares (93.6 % by sherd count, 42.8 % by weight) including everted, rounded and vertical-rimmed jars and a beaker. Two of the grey ware vessels are decorated, one with a circle in relief and the other with barbotine or 'poppy head' decoration (*cf* Grimes 1930, fig 63, no 49). The traded and imported wares include a Lyon ware black colour-coated vessel, one small fragment of Dorset BB1 and Spanish amphorae including Dressel 20 (Chester fabric 145) and Cadiz types, (Chester fabric 1, NRRFC code CAD AM).

Cess pit (1256)

The cess pit in the south-western area of the excavation (1256) produced 607 sherds (6,300 g) from fills (1064), (1246), (1202) and (1216), giving an average sherd weight of 10.4 g. The majority of the assemblage is made up of locally-produced oxidised and reduced wares. The imported and traded wares make up 5.8 % by sherd count and 17.3 % by weight of the assemblage and include southern Gaulish and southern Spanish amphorae, Dorset BB1, white wares and Lyon colour-coated ware. The condition of the pottery is generally good though inevitably some sherds are weathered with flaking or pitted surfaces. The fragmentary nature of the material is reflected in the fact that only 18 % of the assemblage by sherd count and 46 % by weight can be identified to vessel form. Despite this there is a fairly wide range of vessels present including amphorae, beakers, bowls, jars, dishes, flagons, lids and mortaria, and the group appears to represent discarded 'household' rubbish (Cat nos 5–14, Fig 271).

A fragment of a lamp from (1216) (Func Cat no 128) is one of four from the excavation, but the only one recovered from a phase of Roman activity. Only a small section of the outer edge and wall, and part of the discus survive, in a black colour-coated Lyon ware fabric of 1st-century date (Chester fabric 437, NRRFC code LYO CC).

Another identifiable form is a tazza from (1202), in a fine orange ware fabric, though only the frilling from around the middle of the vessel survives and it has a blackened, possibly burnt core (*cf* Grimes 1930, fig 73 no 213). Four sherds of glazed ware, (31 g) (out of a total of seven from the excavation) were recovered from (1216). Two of the sherds are possibly from bowls and include part of a rim with a brown/amber glaze on a hard orange and grey fabric with a grey core (Cat nos 15 and 16, Fig 271). All of the pottery from the fill of the pit, without exception dates to the 1st or 2nd century.

The red sand layer (1152), which subsequently covered the pit, produced a fragmentary and in some cases weathered assemblage of 108 sherds (430 g) comprising almost entirely of late 1st/early 2nd-century locally-produced oxidised and reduced coarse wares; the exceptions being a Cologne black colour-coated vessel with roughcast decoration and a southern Spanish Dressel 20 amphora. Other identifiable vessel forms include medium-mouthed, everted rim jars, a possible lid-seated flagon and everted and flaring-rim beakers (Cat nos 17 and 18, Fig 271).

Cess pit (1078)

The other large cess pit in this phase (1078) produced 112 sherds of pottery (1,215 g). It was cut into (1076) from which three sherds of pottery (15 g) were recovered. This includes a neckless beaker in a Cheshire Plain fabric, with an almost flat folded rim (*cf* Hinchliffe and Williams 1992, fig 22, no 25; fig 26, no 131 and fig 38, no 341) (Cat no 31, Fig 272). The pottery from pit fills (1100) and (1114) is in a poor abraded condition and comprises all local grey, orange and black-on-brown wares except for one sherd of a southern Spanish Dressel 20 amphora. Identifiable forms include jars, bowls and mortaria (Cat nos 32 and 33, Fig 272).

Layer (1077), which sealed the pit, produced thirty-nine sherds (345 g), all of which are 1st/2nd-century local oxidised and reduced wares including jars and bowls (Cat no 34, Fig 272). Some of the sherds show evidence of having been burnt.

Other deposits

In the north-east area of the site there was an absence of pottery from the surfacing outside the amphitheatre, (1059). However, a post-hole (1051), thought to represent the first of a series of temporary structures built against the amphitheatre wall and the subsequent sealing layers and metalled surface, contained a small group of seventeen sherds (312 g). A fragment of Dressel 20 amphora from the fill (1052) may have served as packing material in the post-hole along with a number of angular stones. Those layers sealing the post-hole, (1061), (1035) and (1036) produced predominantly coarse wares with one sherd of fine orange mica-coated ware. Vessel forms are difficult to identify and the condition of the pottery varies – with iron staining and iron adhering to the surface of some sherds whereas those from the make-up layer (1035) are in a good

fresh condition. The overall date range of this group would appear to be late 1st–2nd century.

The shallow depression (1134), backfilled with sandstone fragments (1133) and thought to be the immediate precursor to the first road surface in the south-western area of the site, produced only three indeterminate body sherds in local fabrics typical of the late-1st to early-2nd century.

Sealing the ‘industrial layer’ (1075) was (1073), thought to be the floor surface of a small stall. This yielded just eight sherds of pottery (130 g), predominantly local coarse wares of indeterminate form, but also the rim of a 1st-century Cadiz amphora (Peacock and Williams 1986, Class 17).

The widespread, and final layer associated with the use of Amphitheatre 1a, (625) produced a large assemblage of pottery (612 sherds; 3,130 g). The high percentage of pottery recovered from samples (71.6 % by sherd count and 31.1 % by weight) is reflected in the low overall average sherd weight of 5.1 g. The assemblage uniformly dates to the late 1st–early 2nd century but the presence of one sherd of Dorset BB1 suggests a date of AD 120 or later. The assemblage comprises a range of forms, the vast majority being coarse ware beakers, bowls (plain, reeded and flat-rimmed), reeded and flat-rimmed dishes, ring-necked flagons, jugs, cups, lids and a range of jars including everted rim, medium-mouthed and neckless. The

small group of fine wares includes a glazed ware beaker, black and red colour-coated vessels, orange mica-coated and white eggshell wares. A representative range of vessels are illustrated (Cat nos 19–30, Figs 271 and 272).

Despite the quantity and range of vessels, there is a notable absence of mortaria. Typical of the pottery from elsewhere on the site the majority comes from local sources, primarily Holt, Wilderspool and Cheshire Plain kilns. There are limited sources of imported and traded wares, including southern Spanish and south Gaulish amphorae, Gaulish colour coats and Dorset BB1.

Catalogue

- 5 Beaded rim jar in coarse orange ware. Thickened wall at the shoulder and evidence of carination; burnished. Chester fabric 152, NFRFC code HOL OX, form 1382. A (1202): Phase 5 fill of pit A (1256); SF 9894. Late 1st–early 2nd century. Fig 271.
- 6 Plain-rimmed shallow dish in coarse orange ware. Heavily burnt and surface flaking. Chester fabric 152, form 139. A (1202) Phase 5 fill of pit A (1256); SF 9928. Cf Grimes 1930, fig 69 no 129, but larger. Late 1st–early 2nd century. Fig 271.

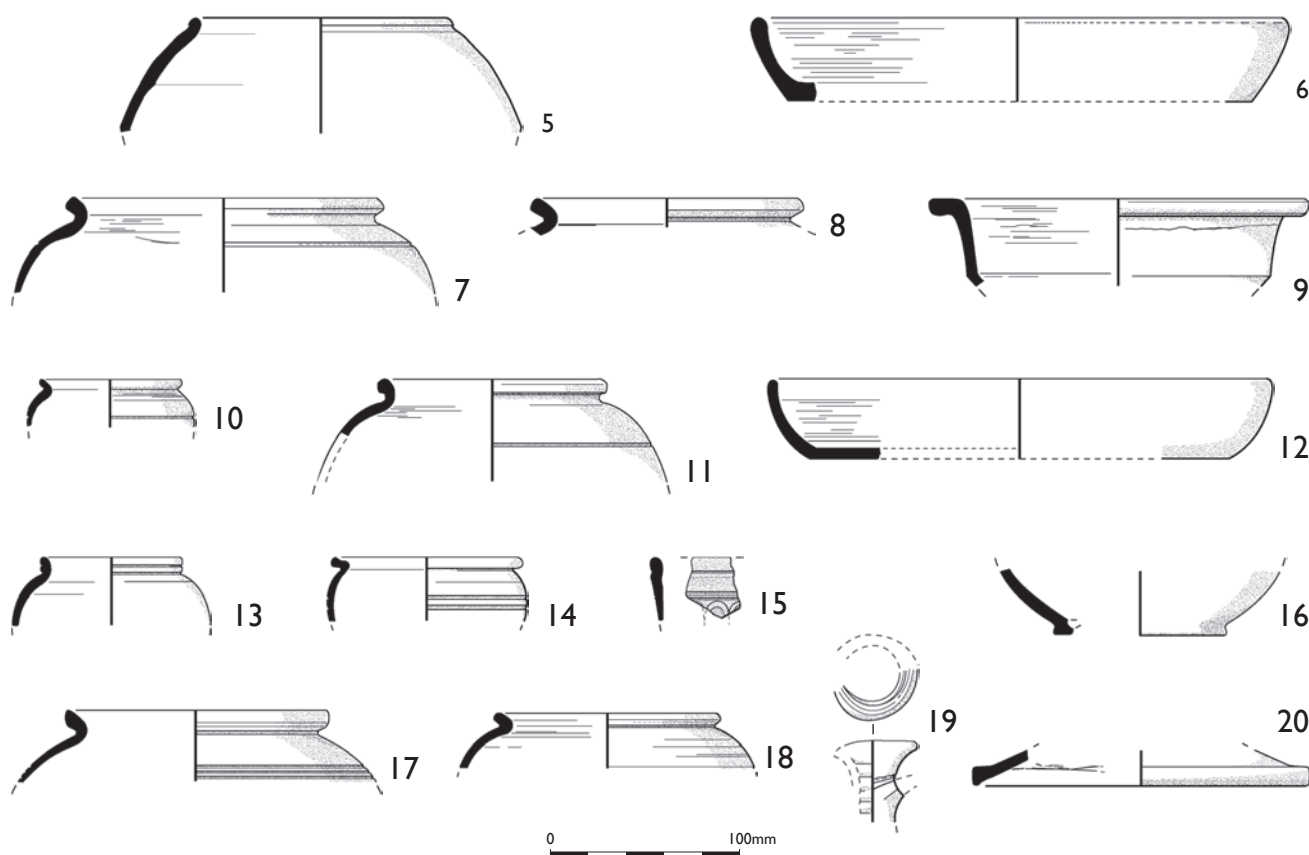


Fig 271 Roman pottery from Phase 5 Cat nos 5–20.

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| <p>7 Medium-mouthed jar in coarse orange ware. Square everted rim and shoulder groove. Chester fabric 194, form 1389. A (1202): Phase 5 fill of pit A (1256); SF 9930. Late 1st–early 2nd century. Fig 271.</p> <p>8 Neckless jar with acute-angled everted rim in coarse orange ware. Edge of rim burnt, internally and externally. Chester fabric 194, form 1390. A (1202): Phase 5 fill of pit A (1256); SF 9980. Late 1st–early 2nd century. Fig 271.</p> <p>9 Flat-rimmed carinated bowl in a coarse hard red ware. Chester fabric 152, form 1365. A (1202) and A (1216): Phase 5 fill of pit A (1256); SF 9981. Late 1st–early 2nd century. Fig 271.</p> <p>10 Everted-rimmed beaker in coarse orange ware. Shoulder groove and bands of burnishing on exterior surface and over rim. Chester fabric 194, form 1391. A (1202): Phase 5 fill of pit A (1256); SF 9982. Late 1st–early 2nd century. Fig 271.</p> <p>11 Medium-mouthed jar in coarse grey ware. Square rim. Groove on shoulder. Probably from same vessel as one recovered from Sa <4784>. Chester fabric 193, form 843. A (1216): Phase 5 fill of pit A (1256); SF 9987. 1st–2nd century. Fig 271.</p> <p>12 Rim of plain-rimmed shallow dish in coarse orange ware. Complete profile. External surface flaking. Probably same vessel as in A (1202). Chester fabric 194, form 1400. A (1216): Phase 5 fill of pit A (1256); SF 10086. Similar to Grimes 1930, fig 69 no 134 but without the thickened base. Late 1st–early 2nd century. Fig 271.</p> <p>13 Vertical-rimmed jar/beaker in coarse orange ware. Two grooves on collar. Chester fabric 194, form 1383. Same vessel as A (1216) and A (1216) Sa <4784>. A (1202): Phase 5 fill of pit A (1256); SF 10087. See Grimes 1930, fig 64 no 78. Late 1st–early 2nd century. Fig 271.</p> <p>14 Square-rimmed beaker/jar in coarse grey ware. Groove on top of rim. Two deep parallel grooves on shoulder. Chester fabric 193, form 1425. A (1216): Phase 5 fill of pit A (1256); SF 10089. Late 1st–early 2nd century. Fig 271.</p> <p>15 Beaded rim ?bowl in a hard orange/grey fabric with a brown/amber glaze which appears black in the grooves and beneath the rim. Two shallow grooves beneath a plain band. Decoration below the grooves but not enough survives to be certain. Patchy glaze on interior. Chester fabric 204, form 1392. A (1216): Phase 5 fill of pit A (1256); SF</p> | <p>9878. Probably of Holt manufacture. 1st century. Fig 271.</p> <p>16 Footring of glazed ware ?bowl. Green/brown glaze on a hard red ware with a grey core. Chester fabric 204, form 1393. A (1216): Phase 5 fill of pit A (1256); SF 9933. Probably of Holt manufacture. 1st century. Fig 271.</p> <p>17 Medium-mouthed jar with everted rim in a coarse grey ware. Blackened on interior and over the lip of the rim. Shoulder grooves. Chester fabric 193, form 806. A (1152): Phase 5 layer over backfilled pit; SF 9983. Late 1st–early 2nd century. Fig 271.</p> <p>18 Everted rim of jar in coarse grey ware. Chester fabric 193, form 330. A (1152) Phase 5 layer over backfilled pit; SF 9984. Late 1st–early 2nd century. Fig 271.</p> <p>19 Rim of a jug in coarse grey ware. Pinched spout and recessed rim, almost lid-seated. Handle scar on neck. Finger print on the underside of the handle. Chester fabric 193, form 1386. A (625): Phase 5 widespread clay layer; SF 9879. Cf Grimes, 1930 fig 67 no 117. Late 1st–early 2nd century. Fig 271.</p> <p>20 Rim of lid in coarse grey ware fabric. Square rim with sooting on edge and underside. Chester fabric 193, form 1396. A (625): Phase 5 widespread clay layer; SF 9880. Late 1st–early 2nd century. Fig 271.</p> <p>21 Beaker or jar in coarse grey fabric; neckless with everted rim. Chester fabric 193, form 1395. A (625): Phase 5 widespread clay layer; SF 9881. Late 1st–early 2nd century. Fig 272.</p> <p>22 Neckless jar with a bead rim in coarse grey ware fabric. Chester fabric 505, form 829. A (625): Phase 5 widespread clay layer; SF 9882. Late 1st–early 2nd century. Fig 272.</p> <p>23 Medium-mouthed jar in coarse grey fabric; square rim. Chester fabric 193, form 823. A (625): Phase 5 widespread clay layer; SF 9883. Late 1st–early 2nd century. Fig 272.</p> <p>24 Neckless jar in coarse orange/brown fabric. Very shallow groove on top of rim. Encrustations on surfaces and broken edges. Chester fabric 194, form 1397. A (625): Phase 5 widespread clay layer; SF 9884. Late 1st–early 2nd century. Fig 272.</p> <p>25 Bowl in orange ware. Slightly acute-angled reeded rim and ?carination. Two sets of girth grooves and some blackening on the outer edge of rim and body. Fine Cheshire Plain fabric. Chester fabric 152, form</p> |
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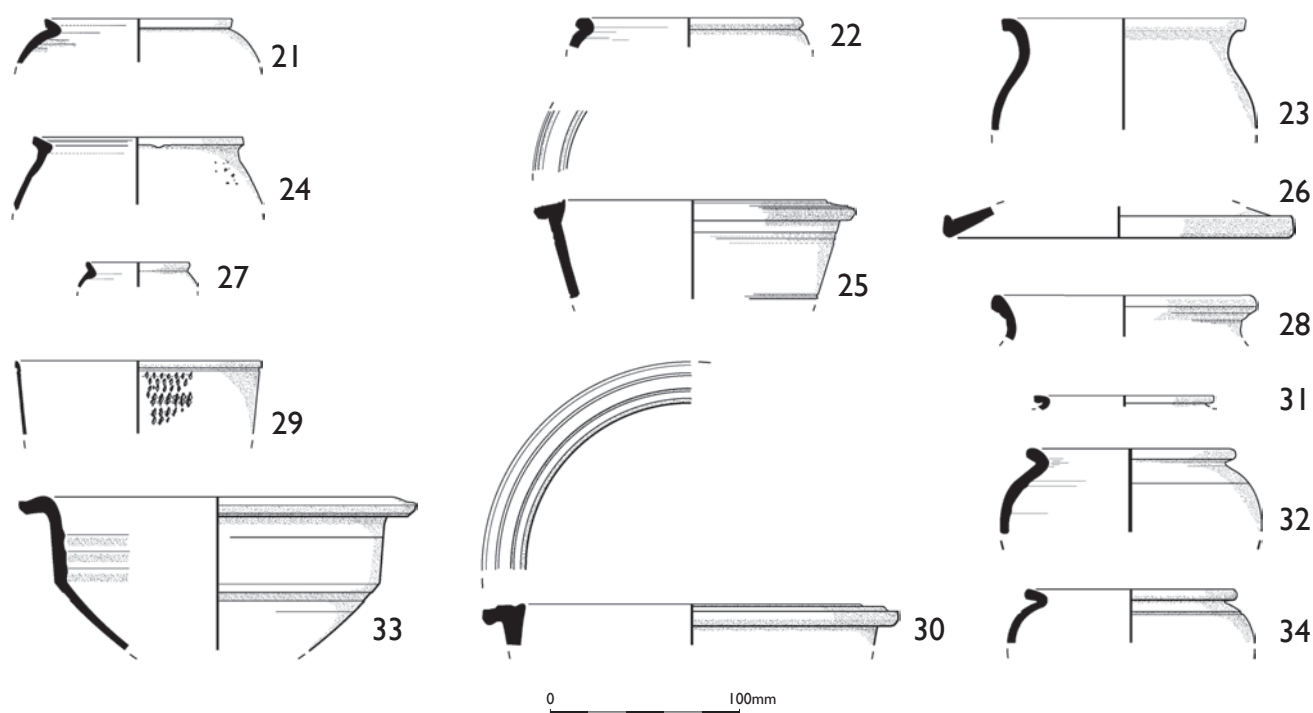


Fig 272 Roman pottery from Phase 5 Cat nos 21–34.

108. A (625): Phase 5 widespread clay layer; SF 9885. *Cf* Grimes 1930, fig 65 nos 84 and 86. Late 1st–early 2nd century. Fig 272.

26 Rim of lid in coarse orange/brown fabric with darker core. Chester fabric 194, form 1348. A (625): Phase 5 widespread clay layer; SF 9886. *Cf* Grimes 1930, fig 66 no 98. Late 1st–early 2nd century. Fig 272.

27 Globular beaker in coarse orange Holt fabric. Slightly everted, almost vertical rim. Chester fabric 151, form 1177. A (625): Phase 5 widespread clay layer; SF 9887. *Cf* Grimes 1930, fig 71 no 196, but smaller. Late 1st–early 2nd century. Fig 272.

28 Medium-mouthed jar in coarse grey ware with triangular rim. Chester fabric 193, form 1394. A (625): Phase 5 widespread clay layer; SF 9888. Late 1st–early 2nd century. Fig 272.

29 Straight-sided cup in fine white eggshell ware. Groove just below rim and rouletted decoration. Chester fabric 475, form 1398. A (625): Phase 5 widespread clay layer; SF 9931. Late 1st–early 2nd century. Fig 272.

30 Acute-angled reeded-rim bowl in coarse grey/buff fabric. Chester fabric 193, form 831. A (625); Phase 5 widespread clay layer; SF 9968 Sa <4704> and

SF 9969 Sa <4707>. Late 1st–early 2nd century. Fig 272.

31 Neckless beaker or small jar in coarse orange ware. Almost flat rim with body ‘folded’ up against the underside of rim, touching in some areas but rim is uneven. Chester fabric 194, Cheshire Plain, form 1388. A (1076) Phase 5 sand dump; SF 9929. Similar rim form to Hinchliffe and Williams 1992, fig 22 no 50, fig 26 no 131 and fig 38 no 341. 1st–2nd century. Fig 272.

32 Everted rim of medium-mouthed jar in coarse orange/red fabric. High shouldered vessel. Chester fabric 194, form 1399. A (1100): Phase 5 fill of cess pit; SF 9890. Late 1st–early 2nd century. Fig 272.

33 Plain-rimmed carinated bowl in coarse orange Holt fabric. Weathered and slight trace of burning on the edge of the rim. Chester fabric 152, NFRFC code HOL OX, form 1365. A (1100): Phase 5 fill of cess pit; SF 9895. *Cf* Grimes 1930, fig 65 no 82. Late 1st–early 2nd century. Fig 272.

34 Everted rim jar in a coarse orange sandy fabric. Round bodied vessel with a groove on the shoulder. Chester fabric 194, form 1328. A (1077): Phase 5 fill of cess pit (1078); SF 9974. Late 1st–early 2nd century. Fig 272.

Table 61 Phase 6 pottery from outer ring beam and radial timber frame slots.

Feature	No of sherds	Weight (g)
Outer ring beam	9	34
Radial timber frame 8	1	9
Radial timber frame 11	6	12
Radial timber frame 12	3	3
Radial timber frame 13	21	103
Radial timber frame 14	2	18
Radial timber frame 15	16	35
Radial timber frame 16	4	15
Widespread layer [319] and other re-deposited layers around and between framework	131	627
Total	193	856

Phase 6. Amphitheatre 1b structural alterations

This phase produced the largest quantity of pottery from any phase, consisting of 1,951 sherds (16,502 g) of coarse and fine wares together with 165 sherds (only 6 of which were from Area A) (778.5 g) of South Gaulish samian ware (Table 39; p 251)

Area A

The lower layer of terrace fill, (1132), (1214) and (1138) produced a very fragmentary assemblage of fifty sherds (141 g) of late 1st–early 2nd-century local oxidised and reduced ware vessels. A high proportion of the assemblage (forty sherds; 90 g) are probably from the same grey ware everted rim jar or beaker from (1132) with grooves and cordons around the neck and shoulder as well as some iron staining and burnishing.

The pottery from the outer ring beam and radial beams is summarised in Table 61. Pottery was recovered from seven of the sixteen radial timber frame slots excavated. No pottery was recovered from the inner ring beam.

From the outer ring beam, pottery was recovered from the slot with the beam impression (1032), the cast of the ring beam (578), the bedding at the base of the slot (704) and the packing deposit (612). The assemblage, comprising only nine sherds (34 g) includes a rim fragment of a Holt orange ware bowl similar to that from (789) and the same vessel as that from (971); local grey ware and a fine white ware jar/beaker with orange/brown barbotine circle decoration (*cf* Grimes 1930 fig 63, no 55) from the beam impression and cast. The material from the bedding and packing deposits comprises just two sherds of local grey wares including an everted rim jar or beaker, and more of the fine white ware vessel with barbotine decoration. Several examples of this vessel type occur in this and other phases.

A total of 53 sherds (195 g) were recovered from the

radial beams (Table 61). The low average sherd weight of just 3.7 g is reflected in the fact that many of the sherds were recovered from samples. The material comes from the primary and basal fills of the slots, as well as the casts of the base plates, uprights and diagonal bracing timbers. The majority are locally-produced oxidised and reduced wares including bowls, jars, flagons and beakers including the rim of a small neckless jar in an orange mica-coated fabric (Chester fabric 209), (Cat no 35, Fig 273), sherds of a white ware beaker with barbotine circle decoration, (Cat no 2, Fig 270) and an unusual rolled rim of a grey ware ?bowl (Cat no 36, Fig 273). Imported wares are represented by a sherd of a black colour-coated Lyon ware roughcast vessel and a red colour-coated dish in a Central Gaulish micaceous fabric (Chester fabric 462, NFRFC code CNG PR3) similar to that from Phase 3 (1123) (Cat no 1, Fig 270).

All of this material is of mid-late 1st to early 2nd-century date, except for one sherd of a Dorset BB1 vessel from the radial base plate 11 – the timber preserved as a sandy silt (923). As a small body sherd it is difficult to identify it to a definite form but the cross-hatching is indicative of an early to mid-2nd-century date (but see caveat on p 158).

There is also a group of material from those layers around the base plates and uprights and other re-deposited layers, presumed to have come from the arena, as well as dumped deposits from between radial frames 13 and 14, probably derived from the excavation of timber slots (789) and (1031). This comprises a range of fabrics including red colour-coated, grey, white and orange vessels and a black calcite-tempered ware. Forms include a dish, bowl, beaker, jar and an amphora lid.

There are numerous cross-joins of sherds from these layers associated with the structural alterations in this Phase, including a black calcite-tempered bowl, in a vesicular fabric, decorated with diagonal grooves (Cat no 37, Fig 273). These sherd links are accounted for because material deposited in Phase 4, as part of the construction of Amphitheatre 1a, was subsequently disturbed in Phase 6 during the excavation of the radial beam-slots.

Area B seating bank

The seating bank deposits in Area B were excavated in two blocks for logistical reasons, and a block of seating bank deposits was given a group context number for planning purposes (2612). All the pottery from the accumulated seating bank deposits is discussed as one assemblage. This also includes the group of deposits which appeared to derive from the Roman seating bank and probably represented a trench collapse in antiquity (see Phase 11b). There is a total of 1,721 sherds (15,314 g, including (2612)) (Table 62).

A high percentage of the pottery, 77.3 % by sherd count and 39.1 % by weight, was recovered from samples and is subsequently very fragmentary, giving an average sherd weight of 8.9 g. This has also resulted in a high percentage

Table 62 Quantification of the pottery, by fabric, from seating bank deposits in Area B.

Fabric	No. of sherds	Weight (g)
Black-surfaced (Fabric 203)	10	7
Black colour-coated (Fabric 205)	1	1
Black colour-coated (Fabric 437, LYO CC)	5	4
Red colour-coated (Fabric 206)	3	7
White eggshell ware (Fabric 211)	13	14
Orange mica-coated (Fabric 209)	41	141
Black-on-brown (Fabrics 10 & 11)	75	451
White ware (Fabrics 17 & 213, VER WH)	12	644
Black-burnished ware (Fabric 19)	2	5
Grey ware (Fabric 193)	727	5303
Orange ware (Fabric 194)	400	3766
White ware (Fabric 196)	15	36
White-slipped orange ware (Fabric 199)	249	1577
White-slipped orange ware mortarium (Fabric 528, WIL WS)	1	35
Mis-fired white-on-grey (Fabric 244)	2	9
Grog-tempered	3	33
Mortaria (unknown fabric)	3	425
Amphora (Fabric 145, GAL AM 1)	4	53
Amphora (Fabric 142, BAT AM 1)	122	1947
Amphora (Fabric 200)	28	652
Amphora (Fabric 792)	2	110
Unidentified fabric	3	94
Total	1721	15,314

of unidentifiable forms. However, the condition of the pottery is generally good with some notably in a very good, fresh condition.

There is a wide range of pottery fabrics, both fine and coarse, and vessel forms, including jars, lids, flagons, beakers, dishes, bowls, tazze and a colander/strainer. It is somewhat unusual, however, in an assemblage of this size to have only eight sherds of mortaria. Though the majority of vessels are plain, there are burnished, rouletted, roughcast and rusticated vessels, along with some orange and white barbotine decoration. The nature of the assemblage would suggest that it is rubbish derived from the fortress and/or outlying *canabae* (Cat nos 38–57, Figs 273 and 274).

The dating of these deposits is hampered by the lack of recognisable forms. The vast majority is dated to the late 1st–early 2nd century. The sherds that deviate from this include three body sherds of Late Iron Age/early Roman grog-tempered ware; three body sherds of Dorset BB1, which have a *terminus post quem* of AD 120 and a mortarium in a Wilderspool white-slipped orange fabric

(Chester fabric 528, NRFRC code WIL WS) which is a typical 2nd-century form. However, there is also a north African amphora from (2461) (Chester fabric 792, Chester form no 1379), Peacock and Williams class 33 or 34 (Peacock and Williams 1986), imports of which commence in the 2nd century but this is a type more common in the 3rd and 4th centuries (Cat no 57, Fig 274).

Catalogue

- 35 Neckless jar in orange mica-coated ware. ‘Folded’ square rim. Chester fabric 209, form 727. A (923): Phase 6 preserved timber; SF 9979. Late 1st–early 2nd century. Fig 273.
- 36 ?Bowl in coarse grey ware. Pale grey surfaces with almost white, coarse core. Small rolled rim. Chester fabric 193, form 1410. A (522): Phase 6 packing for base plate; SF 9967. Late 1st–early 2nd century. Fig 273.
- 37 Rim and body sherds of bowl in a black vesicular calcite-tempered fabric. Coarse, hard fabric and micaceous surfaces. Everted rim; diagonal groove decoration on wall. No joining sherds but probably all from one vessel. Chester fabric 791, form 1401. A (789); SF 8326, A (1046) SF 8460 and A (1031) SF 8410: Phase 6 timber slots. Early–mid 1st century. Fig 273.
- 38 Beaker in fine white eggshell ware. Small flaring rim. Some iron and copper-alloy staining. Chester fabric 211, form 1402. B (2513): Phase 6 seating bank deposit; SF 8807. Late 1st–2nd century. Fig 273.
- 39 Reeded-rim dish in coarse orange ware. Heavily burnt on interior and exterior; flat base. Chester fabric 152, NRFRC code HOL OX, form 1403. B (2552): Phase 6 seating bank deposit; SF 9924. Cf Grimes 1930, fig 69 no 151. Late 1st–early 2nd century. Fig 273.
- 40 Flat-rimmed bowl in a coarse orange ware. Girth groove; sandy encrustation on outer surface, rim and broken edges. Chester fabric 152, NRFRC code HOL OX, form 1404. B (2498): Phase 6 seating bank deposit; SF 9925. Late 1st–2nd century. Fig 273.
- 41 Dish in coarse orange ware. Plain, slightly inturned rim. Blackened surface. Chester fabric 194, form 1378. B (2543): Phase 6 seating bank deposit; SF 9926. Cf Grimes 1930, fig 69 no 134. Late 1st–early 2nd century. Fig 273.
- 42 Jar in coarse orange ware. Almost vertical rim. Some blackening on rim; two shallow grooves on

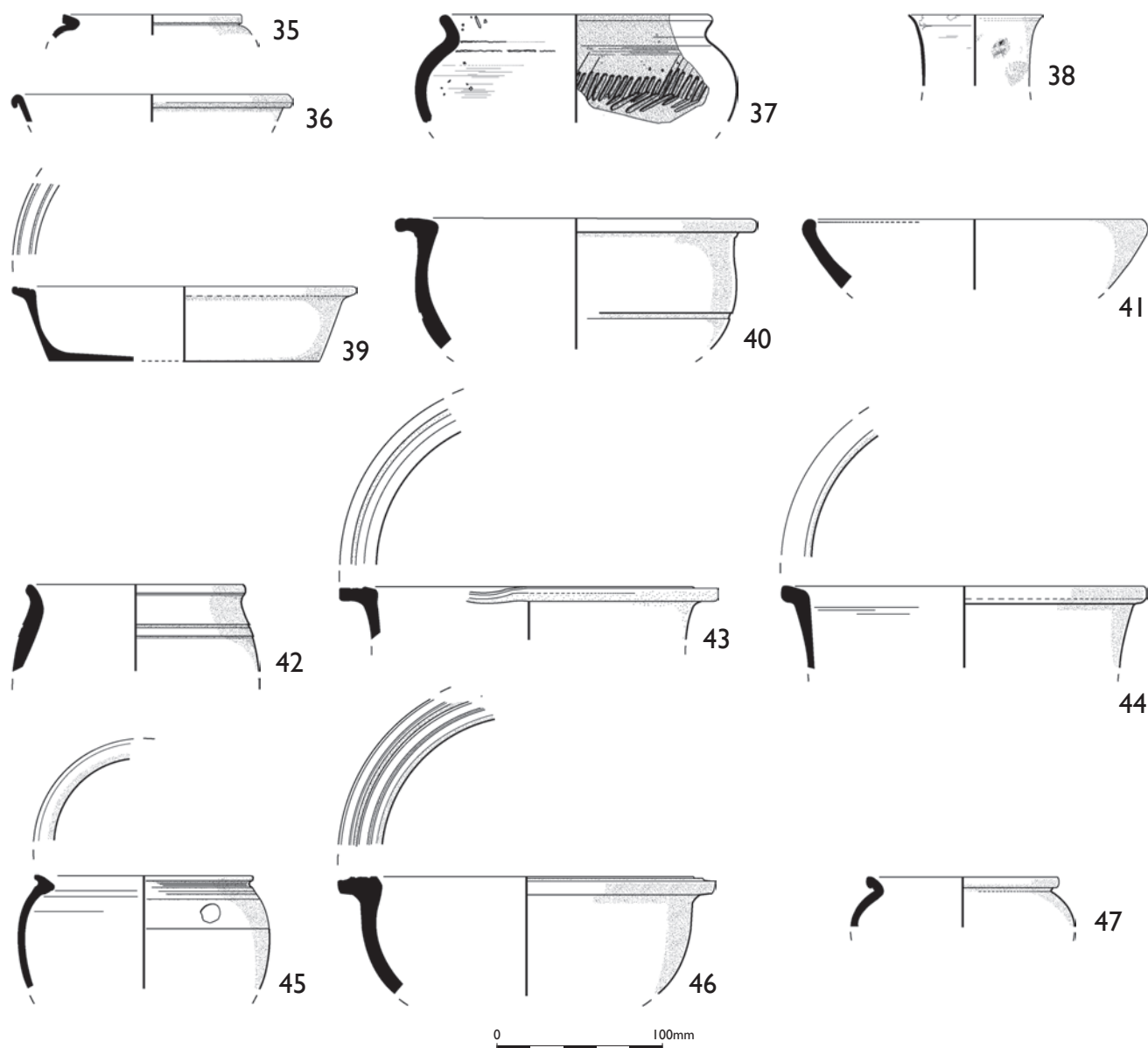


Fig 273 Roman pottery from Phase 6 Cat nos 35–47.

shoulder. Chester fabric 152, NRRFC code HOL OX, form 1405. B (2372): Phase 6 seating bank deposit; SF 9941. Late 1st–early 2nd century. Fig 273.

- 43 Reeded-rim bowl, possible waster. Uneven and smeared on inside edge of rim. Blackened on edge and underside of rim. Chester fabric 154, NRRFC code HOL OX, form 289. B (2372): Phase 6 seating bank deposit; SF 9942. Late 1st–early 2nd century. Fig 273.

- 44 Bowl in coarse orange/brown ware. Flat rim, slightly chamfered. Pitted interior surface, burnt over some of the rim and body. Chester fabric 194,

form 1406. B (2461): Phase 6 seating bank deposit; SF 9943. Fig 273.

- 45 Everted rim of jar in fine orange mica-coated ware. Four girth grooves beneath rim. Trace of an indented circle on the shoulder suggesting that it may have been decorated. Chester fabric 467, form 1407. B (2498): Phase 6 seating bank deposit; SF 9945. *Cf* Grimes 1930, Fig 63 no 50; Dodd 2010a, Ill I.21 no 20. Late 1st–2nd century. Fig 273.

- 46 Bowl in coarse orange ware. Hemispherical with reeded rim. White substance on internal surface. Chester fabric 194, form 267. B (2500): Phase 6

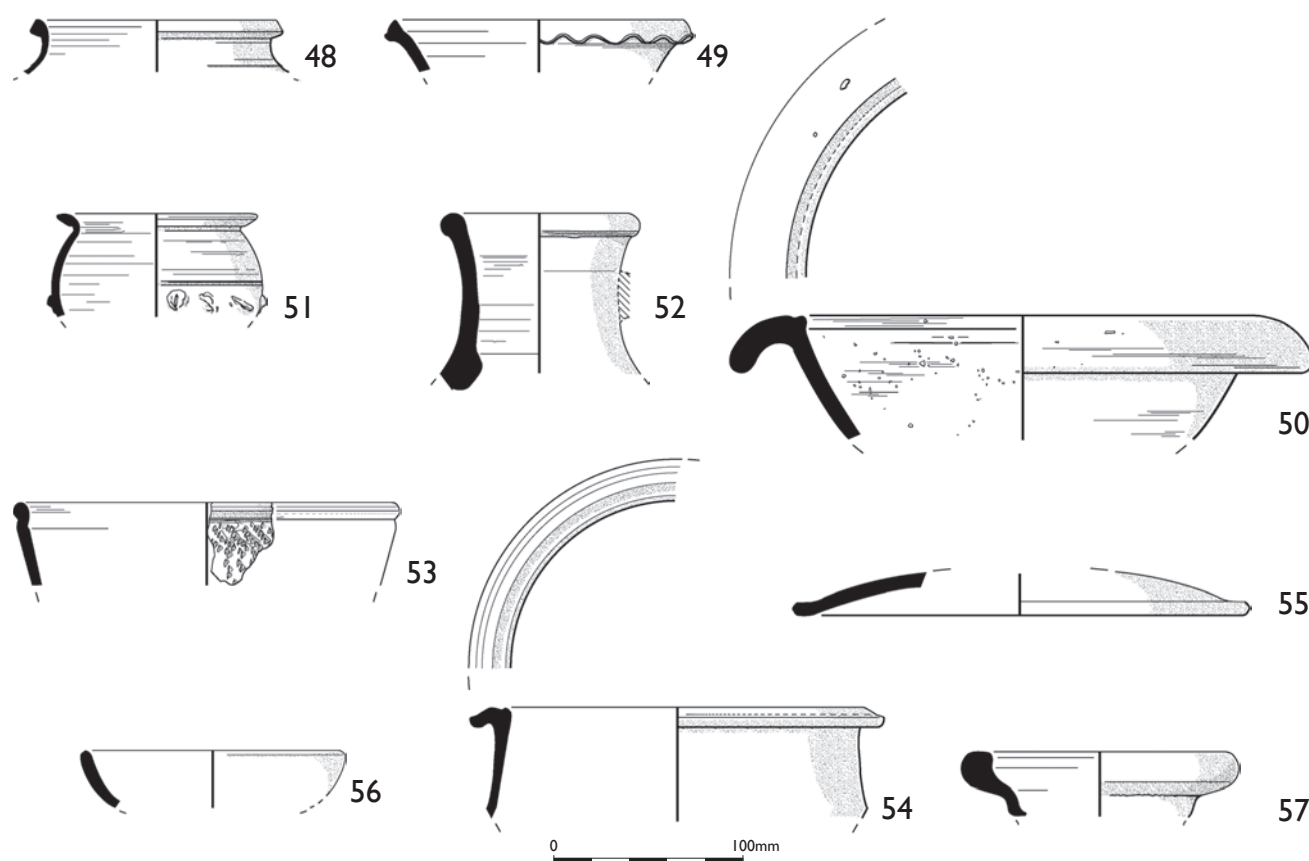


Fig 274 Roman pottery from Phase 6 Cat nos 48–57.

seating bank deposit; SF 9947. Late 1st–2nd century. Fig 273.

- 47 Jar in coarse grey ware. Small everted rim. Burnished and evidence of burning on interior. Chester fabric 193, form 330. B (2500): Phase 6 seating bank deposit; SF 9948. Late 1st–2nd century. Fig 273.

- 48 Jar in coarse grey ware. Medium-mouthed with triangular rim. Girth grooves. Chester fabric 193, form 1408. B (2498): Phase 6 seating bank deposit; SF 9950. Late 1st–2nd century. Fig 274.

- 49 Jar in coarse orange ware. Triangular frilled rim. Chester fabric 151, form 1418. B (2513): Phase 6 seating bank deposit; SF 9951. Cf Hinchliffe and Williams 1992, fig 33 no 255. 2nd century. Fig 274.

- 50 Mortarium in coarse white *Verulamium* ware. Hooked rim; pinkish fabric. Interior worn but some flint grits visible. Chester fabric 213, NRFRC code VER WH, form 331. B (2513): Phase 6 seating bank deposit; SF 9952. 1st century. Fig 274.

- 51 Medium-mouthed jar in coarse hard grey ware. Everted rim; girth groove, rusticated beneath.

Chester fabric 193, form 845. B (2543) Sa <4310>: Phase 6 seating bank deposit; SF 9953. Late 1st–early 2nd century. Fig 274.

- 52 Rim and neck of flagon in coarse orange ware. Rounded rim; handle scar. Chester fabric 152, form 273. B (2543): Phase 6 seating bank deposit; SF 9954. Late 1st–early 2nd century. Fig 274.

- 53 Beaker or bowl in white ware. Fine pinkish fabric with rouletting. Chester fabric 196, form 1409. B (2543) Sa <4322>: Phase 6 seating bank deposit; SF 9955. Fig 274.

- 54 Acute-angled reeded-rim bowl in coarse grey ware; carinated. Chester fabric 503, form 831. B (2612): Phase 6 seating bank deposit; SF 9957. Late 1st–early 2nd century. Fig 274/

- 55 Lid in coarse sandy orange ware. Burnt on edge of rim and broken edges. Chester fabric 152, form 266. B (2612): Phase 6 seating bank deposit; SF 9958. Late 1st–early 2nd century. Fig 274.

- 56 Plain-rimmed shallow dish in coarse orange ware. Surface flaking on interior; burnished. Chester fabric 194, form 1400. B (2612) Sa <4373>: Phase 6

seating bank deposit; SF 9986. Late 1st–early 2nd century. Fig 274.

- 57 Amphora rim. North African form with thin white ‘wash’ and rough feel to surfaces. Chester fabric 792, NRFRC code NAF AM, form 1379. B (2461); SF 9993. Peacock and Williams Class 33 but fabric appears to be more like Class 34 as virtually no limestone (Peacock and Williams 1986), see Tyers (1996, 104–105) and Keay (1984, Type III fig 37 and p 100). Mid 2nd century but more common 3rd–4th century. Fig 274.

Phase 7. Amphitheatre 1b use

To the 661 sherds (4,714 g) of coarse and fine ware should be added 104 sherds (382 g) of samian ware, of which most was South Gaulish. Central Gaulish wares accounted for, but 6.15 % of the assemblage, however (Tables 42; p 255).

Roads

The metallised surfaces and patches associated with the use of Amphitheatre 1b, (1012), (1088) and (1028), and the level from which Amphitheatre 2 was built produced 17 sherds of pottery (493 g). All vessels were locally produced coarse wares except for the handle of a southern Spanish Dressel 20 amphora. The only other identifiable form was a white-slipped orange flagon.

The road (557) between the outer walls of Amphitheatre 1 and 2 in the western area of the excavation produced 14 sherds (105 g) again all locally-produced oxidised and reduced wares including a white-slipped orange flagon and a Holt oxidised ware lid and flat-rimmed bowl, all of a late 1st to early 2nd-century date. One of the layers pre-dating this road surface, (1056) produced 15 sherds (166 g). In addition to local grey and orange wares, there is a white-slipped orange flagon, and a 2nd-century white-slipped orange mortarium in a Wilderspool fabric (Chester fabric 528, NRFRC code WILWS).

The road at the eastern end of the site, between the walls of Amphitheatre 1 and 2, produced just four sherds of pottery, from the south side of the kerb and from the sealing deposit of the ruts (814) and (830). These include grey ware vessels, including a very thick-walled vessel and the handle of an early 1st-century amphora.

South and west of the vomitorium

The widespread dump sealing the road edge and around the wall of the amphitheatre (899) produced 86 sherds of pottery (656 g) including grey ware square and rolled rim jars (Cat nos 58 and 59, Fig 275), some with rouletted decoration; white-on-orange jars and flagons; weathered orange ware vessels, some encrusted with a sandy material; southern Gaulish amphorae (Chester fabric 142, NRFRC code GAL AM1); the bead and part of the hooked rim of a white-slipped orange Wilderspool mortarium (Chester

fabric 528, NRFRC code WILWS) and one sherd of Chester/Foregate Street misfired grey ware. All of this material is dated to the 1st and 2nd centuries.

The material piled against the outer wall of the amphitheatre and that which survived around the later post-holes (870) and (871) produced just three sherds of residual oxidised wares in a Holt fabric of the late 1st/early 2nd century.

The fills of the three post-holes associated with a short-lived timber building or stall against the outer face of the wall of Amphitheatre 1b, (969), (876) and (888) produced only six very small sherds of pottery (just 7 g). Fabrics include black-on-brown, grey, orange and white-slipped orange wares and Dressel 20 amphora. A probable floor surface (894), associated with this structure contained nine sherds of pottery (66 g). This included a hard red ware, grey, black-on-brown, white-slipped orange ware of indeterminate form, and southern Gaulish amphora. The condition of this pottery is poor, with weathered and flaking surfaces.

Following the disuse of this structure there was an extensive spread of material (838) which produced an assemblage of twenty-three sherds (165 g). This was also typically 1st/2nd-century locally-produced oxidised and reduced wares which though fragmentary, are generally in a good condition but there are no discernible vessel forms except for a possible flagon or jar in a white-slipped orange fabric.

The deposits from the collapsed structure at the eastern end of the site produced twenty-five sherds (125 g), all of which were locally-produced 1st- and 2nd-century wares but also includes a sherd of a 1st-century *Verulamium* region white ware vessel from (859) (Chester fabric 17, NRFRC code VER WH).

Clearance and dumping around the amphitheatre

This series of dumps produced 89 sherds (502 g). Some of this material is in a friable and abraded condition. Vessels include a grey ware necked jar in a hard fabric (*cf* Hinchliffe and Williams 1992 fig 29, no 181, fig 71 no 413 and fig 74, no 493). The oxidised wares include vessels with barbotine decoration of white circles (Grimes 1930, Fig 63, no 54), and a black-surfaced jar or beaker (Chester fabric 163). The rest of this dumped material comprises the usual assemblage of locally-produced 1st/2nd-century oxidised and reduced wares, the majority of which are of indeterminate form.

The layer that sealed all these dumping episodes, (555) produced 36 sherds (205 g) including a thick-walled oxidised bowl in a Holt fabric (Chester fabric 152), an orange burnished dish and a fine oxidised vessel with white barbotine circle decoration. The grey wares include a beaker or jar with a plain rim and a groove and cordon on the neck, an unusual bowl, chipped and in a poor condition, with a reeded rim which is turned in at the junction with the vessel wall (Cat 60, Fig 275), as well as rusticated vessels

and others with fine rouletted decoration. There is also an unusual ?Wilderspool white-slipped orange ware dish or bowl with a plain rim and beading *c* 10 mm from the rim which is possibly an imitation of a samian Dragendorff 37 vessel (Cat no 61, Fig 275). Only slight traces of the slip remain *cf* Leary for the form (2008 fig 58, no 100), Jones (1972 fig 11, no 16) and Hinchliffe and Williams (1992 fig 30, no 208).

North and east of the vomitorium

Two other significant assemblages of pottery from this Phase, come from islands of intact stratigraphy between later cut features in this area. One such island of dumped sand deposits (669), (671), (672) and (673) produced 44 sherds (186 g), all coarse wares except for one sherd of white eggshell ware (Chester fabric 475). Holt orange ware, grey, white-slipped orange and black-on-brown wares are all present. The majority are of indeterminate form, but two square-rimmed and one neckless grey ware jars are present. There is a sherd link of a grey ware lid, between (673), a deposit in the area outside the amphitheatre, and (625), an occupation layer in Phase 5 (*cf* Grimes 1930, fig 66, no 98). This is explained by the fact that (673) appears to be a re-working of (625) when the timber-framed seating structure was installed.

A second island (125–135) produced a varied assemblage of 136 sherds (1,108 g). Comprising both fine and coarse wares there is a range of forms including five grey ware medium-mouthed jars (Chester forms 818, 823, 830 and 843), Holt oxidised and white-slipped orange mortaria, a Wilderspool oxidised bowl (Chester fabric 467, form 1369), an orange ware beaker with white barbotine stripes (Cat no 63, Fig 275), similar to a grey ware example from the site at Gorse Stacks (Timby 2012, fig 2.22, no 62), a black-on-brown lid, white-slipped orange flagon and southern Spanish amphorae, both Dressel 20 and Chester form 449 from Cadiz. There are also two sherds of what appear to be Chester/Foregate Street mis-fired white-slipped grey ware of indeterminate form (Chester fabric 244). Amongst the fine wares there is white eggshell ware, Lower Rhineland black colour coat (Chester fabric 429) with roughcast decoration, Holt orange mica-coated ware (Chester fabric 467) and three vessels in black-surfaced fabrics (Chester fabrics 161, 163 and 167) including a lid (Chester form 1367) (Cat no 64, Fig 275) (Ward, M 1981, 51–68) and a jar (Chester form 1368 (Cat no 65, Fig 275)).

Shrine

The pottery associated with the use and disuse of the shrine amounts to 115 sherds (606 g), giving an average sherd weight of just 5.2 g. However, almost half of the sherds belong to just two vessels.

Only two sherds of pottery (7 g), are associated with the preparation of the second Phase stone structure, and come from the backfill of the western beam-slot (741). These belong to hard fine grey ware vessels and there is a

sherd link with a beaker recovered from the alcove of the shrine (790). The vessel has a small everted rim and a flat base (Cat no 62, Fig 275).

Other pottery from the shrine comes from the stone core of the east wall (811) and (819), just four sherds (14 g) of late 1st/early 2nd-century grey and orange wares. Once again there is a sherd link between (819) and (755), one of the deposits in the alcove. The primary floor surface (995) did not yield any pottery but those deposits pertaining to the use of the shrine ie the compacted sand layers inside the alcove, (790) and (795); a deposit of mixed material and charcoal (831) and the internal compacted sand (755), produced 44 sherds (191 g), including the grey ware beaker already discussed and part of the wall of an orange mica-coated carinated vessel, possibly a beaker or flagon of 1st–2nd-century date. The deposits that built up during the lifetime of the shrine, to the south and west (801, 797, 788, 787, 784 and (744) produced 12 sherds (69 g). The pottery is in a fairly good condition, comprising oxidised vessels, reduced and white-slipped orange flagons and jars, along with two body sherds of Dorset BB1. Following the disuse of the shrine the accumulation of surfaces to the east, (698) and (725) produced 45 sherds (285 g), comprising oxidised wares (including Severn Valley wares), grey, white-slipped orange wares and Dorset BB1.

The collapse deposits (752) and (753) inside the alcove produced just seven sherds of pottery (35 g), comprising plain oxidised and reduced wares, none of which can be identified to vessel form; and two small body sherds of grey and orange wares (5 g) came from the subsequent sealing deposit of sand, (809).

Catalogue

- 58 Jar in coarse grey ware. Rolled or rounded, almost flattened rim. Hard fabric. Chester fabric 193, form 1385. (899): Phase 7 widespread deposit sealing road edge; SF 9972. *Cf* Grimes 1930, fig 63 no 63. Late 1st–early 2nd century. Fig 275.
- 59 Medium-mouthed jar in coarse grey ware. Square rim. Chester fabric 193, form 1408. (899): Phase 7 widespread deposit sealing road edge; SF 9973. Late 1st–early 2nd century. Fig 275.
- 60 Reeded rim of bowl in grey fabric. Rim turned in at junction with vessel wall. Blackened, chipped and in poor condition. Chester fabric 193, similar to form 846. A (555): Phase 7 sand dump between amphitheatre walls; SF 10107. First–early 2nd century. Fig 275.
- 61 Plain-rimmed dish or bowl in coarse ?Wilderspool white slipped orange ware. Beading below the rim. Possible samian Dr 37 imitation. Only slight remains of slip. Chester fabric 106, NRFRC code WIL WS, form 1374. A (555): Phase 7 sand deposit

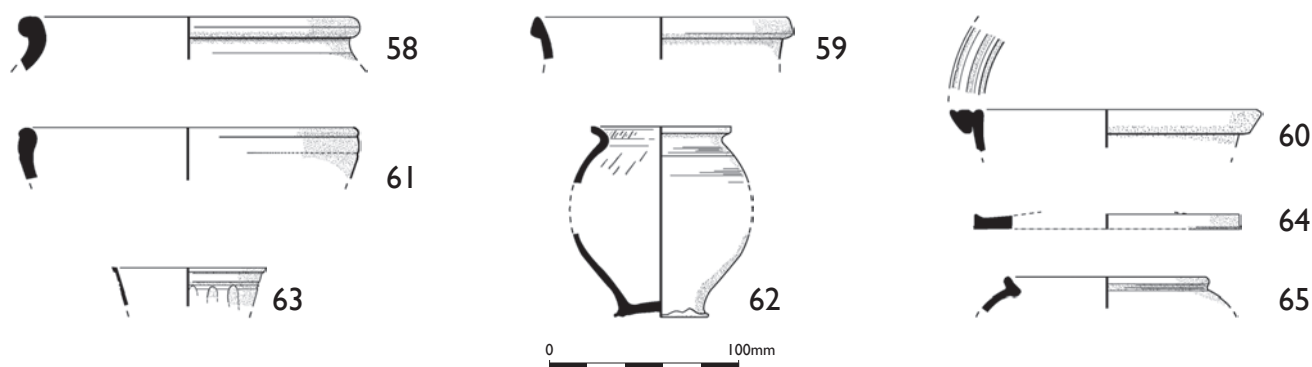


Fig 275 Roman pottery from Phase 7 Cat nos 58–65.

between amphitheatre walls; SF 9889. Cf Leary 2008, fig 58 no 100; Jones 1972, fig 11 no 16 and Hinchliffe and Williams 1992, fig 30 no 208. 2nd century. Fig 275.

- 62 Rim and base of grey ware beaker with everted rim. Hard fine ware. No complete profile. Flat base but roughly finished at base of wall. Hard brown core to the fabric at the base. Sherd links with A (755), (790) and (819). Chester fabric 193, form 1411. A (741): Phase 7 shrine; SF 10091. Late 1st–early 2nd century. Fig 275.
- 63 Rim of beaker in fine orange ware. Flat squared-off rim. Slightly burnished; white barbotine decoration, possibly vertical stripes. Two grooves below rim, decoration overlaps into groove. Chester fabric 194, form 1370. A (132): Phase 7 fill of pit A (125); SF 9989. Late 1st–early 2nd century. Fig 275.
- 64 Lid in fine black-surfaced fabric. Square rim. Slightly coarser than typical fabric. Chester fabric ?163, form 1367. A (126): Phase 7 fill of pit A (125); SF 9991. 1st century. Fig 275.
- 65 Rim of jar/beaker in fine black-surfaced ware. Angle of rim difficult to determine. External and internal surfaces slightly darker than internal, brown core. Chester fabric 161, form 1368. A (126): Phase 7 fill of pit A (125); SF 9990. Late 1st century. Fig 275.

Period 4: The second Roman amphitheatre

Phase 8. Amphitheatre 2 construction

The fills of the construction trench of the outer wall, primarily made up of mason's waste and sandstone chippings, produced 13 sherds of pottery (142 g), all locally-produced Holt, Wilderspool and Cheshire Plain vessels including a grey ware everted-rim beaker and the neck of a white-slipped flagon, and all of a 1st/2nd-century date, plus nine sherds (33.5 g) of South Gaulish

samian ware. The only other imported material is a sherd of Dressel 20 amphora, and a small body sherd of Dorset BB1. The construction trenches cut for the eastern wall of the *vomitorium*, Entrance 11, produced just five sherds of pottery (25 g), grey and orange wares and one sherd of a mortarium in Chester/Foregate Street fabric 246, all of a late 1st–early 2nd-century date. The rim of a plain-rimmed dish in a soft orange/brown fabric (Chester fabric 171, form 1426) came from the masonry of the *vomitorium* (711), (Cat no 66, Fig 276). The only other pottery associated with the construction of Amphitheatre 2 was from (685) and (692), two sherds of what appear to be residual late 1st/early 2nd-century orange and grey wares. The only pottery to come from the outer wall foundation were three sherds of 1st–2nd-century Cheshire Plain oxidised ware of indeterminate form, (8 g), from the puddle clay bonding the courses of the foundation, (726) and (757).

The remaining pottery from this Phase comprises one sherd of oxidised ware in a soft brown laminar fabric of indeterminate form, from (1257), the clay infill of the foundation of pilaster base (1023).

Catalogue

- 66 Plain flaring rim in coarse orange ware. Orange/brown fabric, some burnishing. Similar to Chester fabric 222, a less coarse version of Fabric 171, form 1426. A (711): Phase 8 outer section of *vomitorium* wall; SF 9992. 1st–2nd century. Fig 276.

Phase 9. Amphitheatre 2 use

The only material relating to the use of Amphitheatre 2 came from the road levelling and resurfacing around the outer wall of the building. Like the material from Phase 8 this was entirely residual. Each of the four road levelling and re-surfacing episodes and one of the road repairs produced pottery, giving a total of 39 sherds (2,118 g). The high average sherd weight of 54.3 g is due to the fact that 24 sherds, (62 % by count), are from amphorae, (2,044 g) (97 % of the total weight). Despite this, the sherds of amphora are not particularly large and may have been

selected as levelling or make-up material. The repair (996), however, comprised 15 sherds of 1st–2nd-century Cadiz amphorae (Chester fabric 1 PandW class 17–19, NRFRC code CAD AM) which appear to have been laid on to the surface as opposed to being bedded in. The remainder of the assemblage is made up of very fragmentary grey, orange, white-slipped orange wares and Dorset BB1 of indeterminate form. The overall date of this material is 1st–2nd century and hence residual, the latest date of AD 120+ suggested by the Dorset BB1 vessel from (984), the third re-surfacing of the road.

Post-Roman phases

Periods 5–6: Change of use and robbing

Phase 10. Change of use

A total of 1,577 sherds of Roman pottery, (11,467 g) was recovered from all areas of the excavation.

In Area A the majority of the assemblage was from the trench cut around the outer wall of the amphitheatre. In Area B there was no pottery associated with wall foundation (2525) but there was material from the layers thought to be make-up deposits for the post-pads (2611) and (2609) and the layer which covered the post-pad structures (2610) and (2457), including a fine orange ware beaker with barbotine decoration (Cat no 67, Fig 276). In Area C there are relatively small groups of material from post-holes, linear gullies, pits and tree boles – the exception being an assemblage of 210 sherds from layer (3096) which was largely derived from the arena sands, though it formed in the post-Roman period and covered the entire base of Area C (except where it had been removed by later features).

The fabrics include colour-coated wares, local orange, grey and white-slipped orange vessels as well as Dorset BB1 and *Verulamium* region white wares. There is a range of vessel forms including an everted rim jar, ?flanged bowl, ring-necked flagons, a reeded-rim bowl, globular beaker, a burnished vertical-rimmed beaker with traces of white painted decoration, mortaria and amphorae.

The majority of the pottery is dated to the 1st and 2nd centuries and so is residual in this Phase. The latest material ie late 3rd- and 4th-century Dorset BB1 jars and a plain-rimmed dish were recovered from C (3093), a pit fill in pit group (i).

Catalogue

- 67 Beaker in fine orange ware. Vertical rim, two grooves on the collar and one on the shoulder. Traces of white painted decoration on the shoulder and some burnishing. Chester fabric 154, form 1427. B (2611): Phase 10 make up deposit for post pad; SF 9956. Similar to grey vessel from Holt (Grimes 1930, fig 64 no 78) but similar fabric to Severn Valley ware (Chester fabric 512). Late 1st–early 2nd century. Fig 276.

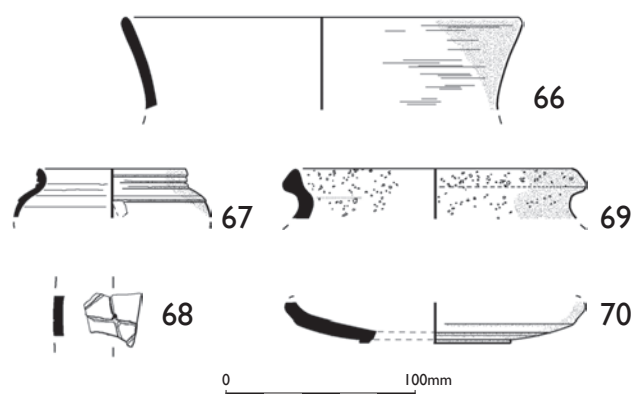


Fig 276 Roman pottery from Phases 6–11b, Cat nos 66–70. No 68 is a body sherd of a jar or flagon with 'X' scored on external surface.

Phase 11a

Robbing of internal walls

A total of 537 sherds of Roman pottery, (7,371 g) was recovered from robber trench fills and levelling deposits in Area A and the backfill of the stone-robbing trench which followed the line of the external wall to the first amphitheatre, in Area B. The earliest fills (2471, 2470, 2468, 2485 and 2488), produced finds only of Roman date, all dating to the 1st and 2nd centuries. A sherd link of a white-slipped orange vessel between (2470) and (2471) may suggest a rapid infilling of the trench.

The material recovered from the robbing trench that followed the line of the eastern flanking wall of the Amphitheatre 2 *vomitorium* entrance comprised early Roman pottery as well as medieval and post-medieval pottery and glass.

The character of the assemblage is one of a wide range of fabrics and forms, predominantly coarse wares, with the fine wares accounting for just 2.6 % by sherd count and 2 % by weight. As is to be expected from this type of deposit the condition of the material varies, some sherds being abraded, others in a good fresh condition.

Forms include jars, beakers, bowls, flagons and lids. Vessels of particular note include a grey ware hemispherical bowl from (244), possibly an imitation of the samian form Dragendorff 37. It has a beaded rim and parallel groove decoration. This is similar to one from the ditch fill at Love Street, Chester (Newstead 1939, pl xxvii no 26). There is also a base sherd from a 2nd/3rd-century tankard from (457) in a vesicular Severn Valley ware fabric (Chester fabric 215, NRFRC code SVW OX2 (Tomber and Dore 1998, 149–50)). This is only one of two sherds in this particular fabric to be recovered from the site, the other being a rim sherd of a dish/bowl from (231) from Phase 12.

An orange ware gaming counter fashioned from the base of a small vessel was recovered from (485) SF 7432 (see p 341) and a body sherd of a white-slipped orange ware vessel with an incised 'X', from A (459) SF 7426 (Cat no 68, Fig 276).

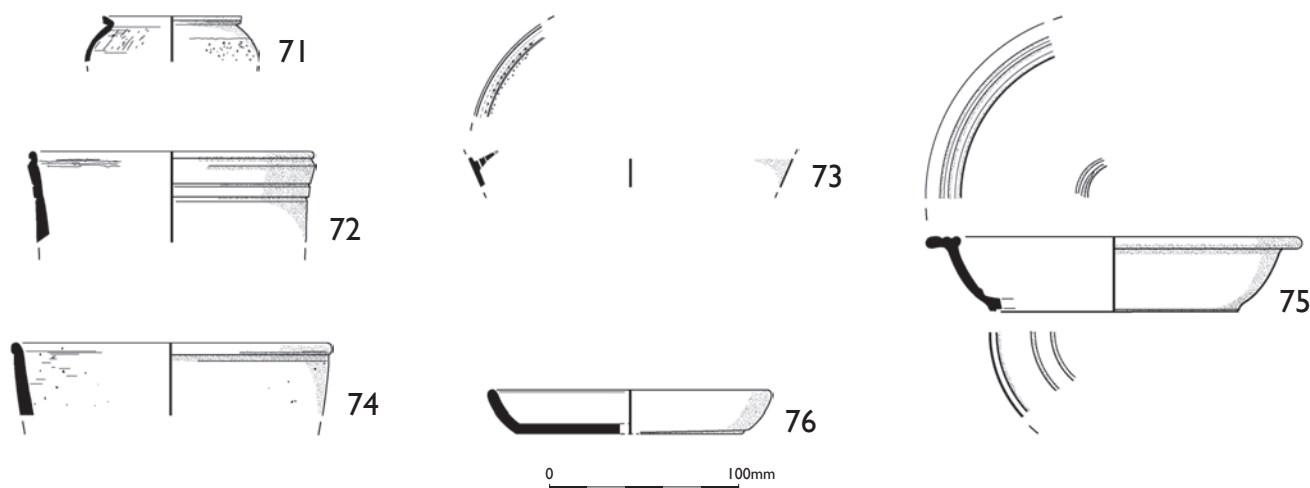


Fig 277 Roman pottery from Phase 12 Cat nos 71–76.

Catalogue

- 68 Body sherd of jar or flagon in a Wilderspool white-slipped orange fabric. There is a wide 'X' scored between parallel lines on the external surface. Roger Tomlin suggests that this represents an owner's mark of identification. Chester fabric 106. (459): Phase 11a fill of robber trench; SF 7426. 2nd century. Fig 276.

Phase 11b

Robbing of external walls

A total of 935 sherds of Roman pottery, (15,957 g) was recovered from this Phase from Areas A and B.

As with the backfill from the internal walls (Phase 11a), the pottery assemblage from the robbing of the external walls comprises a wide range of fabrics and forms, the condition of which varies. The majority of the pottery is of 1st–2nd-century date but there is some noticeably later material including a 2nd–3rd-century white ware flagon from (369) (Chester fabric 137), a sherd of Mancetter/Hartshill white ware of indeterminate form and a mid-2nd/3rd-century Severn Valley ware oxidised jar. Some of the latest pottery to be found on the site, ie mid 4th-century shell-tempered ware (Chester fabric 420) comes from the primary fill B (2491) of the trench that followed the line of the Roman road, parallel to the outer wall of Amphitheatre 2 (Cat no 69, Fig 276) (though this was found in association with Saxon and medieval pottery); and from the robbing of the external walls in Area A, layers (369) and (451).

Some of the backfill deposits from the robber trench of the south wall of the south passage of Entrance 3 produced exclusively Roman material – thirty sherds (334 g). Although the majority are residual local 1st- and 2nd-century wares such as dishes, bowls, flagons and jars, the assemblage also includes a carinated Dorset BB1 bowl (Cat no 70, Fig 276) and the rim sherd of a Dorset BB1 flanged bowl from B (2579) dating to the ?mid 3rd century

(Gillam 1976, Fig 3 nos 43 and 44). The subsequent and systematic back-filling of the robber trench produced only residual Roman material, and includes a gaming counter, fashioned from the base of a coarse orange ware vessel, from (2472) (Func Cat No 201, p 341).

Catalogue

- 69 Jar in shell-tempered ware. Lid-seated rim. Chester fabric 420, form 1412. B (2491): Phase 11b robber trench fill; SF 9944. Mid 4th century. Fig 276.
- 70 Base of carinated bowl in Dorset BB1. Small footring with burnished decoration at base of wall and shallow concentric groove. Chester fabric 19, NRFRC code DOR BB 1, form 1381. B (2476): Phase 11b robber trench fill; SF 9994. Cf Holbrook and Bidwell 1991, fig 41. Mid 2nd century. Fig 276.

Phase 12

Catalogue

- 71 Beaker with cornice rim in black colour-coat fabric. Roughcast decoration. Chester fabric 437, NRFRC code LYO CC, form 988. A (237) Sa <4025>: Post Roman Phase; SF 9891. AD 40–70. Fig 277.
- 72 Beaker in coarse orange ware. Bead rim with groove on inside. Bands of burnishing. Chester fabric 194, NRFRC code HOL OX, form 1413. A (223) Sa <4032>: Post Roman Phase; SF 9927. Late 1st–early 2nd century. Fig 277.
- 73 Part of wine cooler in fine pinkish-white eggshell fabric. Concentric circles of very small holes on internal surface. Burnished. Chester fabric 475, form 1373. A (493): Post Roman Phase; SF 9932. Grimes (1930) classifies these as incense burners

(see fig 73, nos 215 and 216); Gillam (1968) classes them as wine coolers (see fig 32, no 349). See also examples from Heronbridge (Hartley and Kaine 1954, fig 11.65); from Nicholas Street Mews, Chester (Heke and Ward, M 2012b, Ill 3.13 no 12), and Delamere Street, Chester (Timby 2012, fig 2.23 no 101). Late 1st–mid 2nd century. Fig 277.

- 74 Dish/bowl with bead rim in coarse orange ware. Vesicular Severn Valley ware fabric, burnished. Chester fabric 215, NRFRC code SVW OX2, form 1372. A (231): Post Roman Phase; SF 9965. 2nd–3rd century. Fig 277.
- 75 Reeded-rim dish in coarse orange ware. Groove beneath bead of rim. Small footring and groove on external base; two concentric grooves on internal base. Cordon at junction (half-round moulding) of wall and base internally. Soft brown fabric. Chester fabric 194, form 1414. A (522): Post Roman Phase; SF 9966. *Cf* Grimes 1930 fig 71, nos 169 and 170. Late 1st–early 2nd century. Fig 277.
- 76 Plain-rimmed shallow dish in coarse orange ware. Complete profile and almost complete. Uneven base giving slight offset for part of base. Blackening on part of rim and external surface and base. Sherd links with A (221) and (221) Sa <4040>. Chester fabric 194, form 1384. A (218): Post Roman Phase; SF 10088. *Cf* Grimes 1930, fig 69 nos 129 and 131. Late 1st–early 2nd century. Fig 277.

Phase 14

Catalogue

- 77 Jar in fine orange mica-coated ware, probably of Holt manufacture. Two and part of a third raised bosses running vertically. Thumb/finger prints clearly seen on the interior where they have been used to push out the bosses. Chester fabric 209, form no 727. A (162): Post Roman Phase; SF 10101. Similar example from Abbey Green, Chester (CHE/AG75 SF 3108) and *cf* Grimes 1930, fig 63 no 50. Late 1st–early 2nd century. Fig 278.

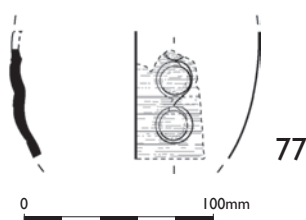


Fig 278 Roman pottery from Phase 14 Cat no 77.

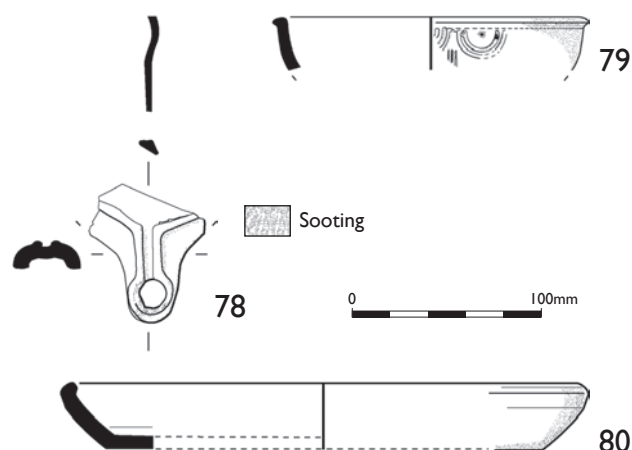


Fig 279 Roman ceramic lamp and vessels from Phase 15 Cat nos 78–80.

Phase 15

Catalogue

- 78 Lamp. Part of discus and nozzle only in a red colour-coat fabric. Burning around the nozzle and fingerprints on the underside. Chester fabric ?436 from Holt. C (3045): Post Roman Phase; SF 7984. Late 1st–early 2nd century. Fig 279.
- 79 Dish/bowl in coarse grey ware. Plain rim with slight groove beneath. Grey fabric with brown margins. Deeply incised decoration below groove comprising two concentric semi-circles with three vertical grooves between. Three indentations just below groove. Chester fabric 193, form 1415. B (2353): Post Roman Phase; SF 9940. Late 1st–early 2nd century. Fig 279.
- 80 Dish in a coarse orange/brown fabric. Complete profile with slightly inturned rim. Chester fabric 194, form 1378. A (389): Post Roman Phase; SF 10100. *Cf* Grimes 1930, fig 69 no 135 Late 1st–early 2nd century. Fig 279.

Phase 16

Catalogue

- 81 Stump of the handle of a Dressel 20 oil-amphora, impressed before firing with a rectangular stamp. Part of one edge survives, but almost none of the field, which is too abraded to be legible. There is a possible trace of an S [identified by R Tomlin]. Chester fabric 142. B (2297): Post Roman Phase; SF 9896.
- 82 Wide-mouthed necked jar in coarse grey ware. Cordon on shoulder; girth groove. Slightly burnished. Chester fabric 193, form 1416. B (2136): Post Roman Phase; SF 9936. Late 1st–early 2nd century. Fig 280.

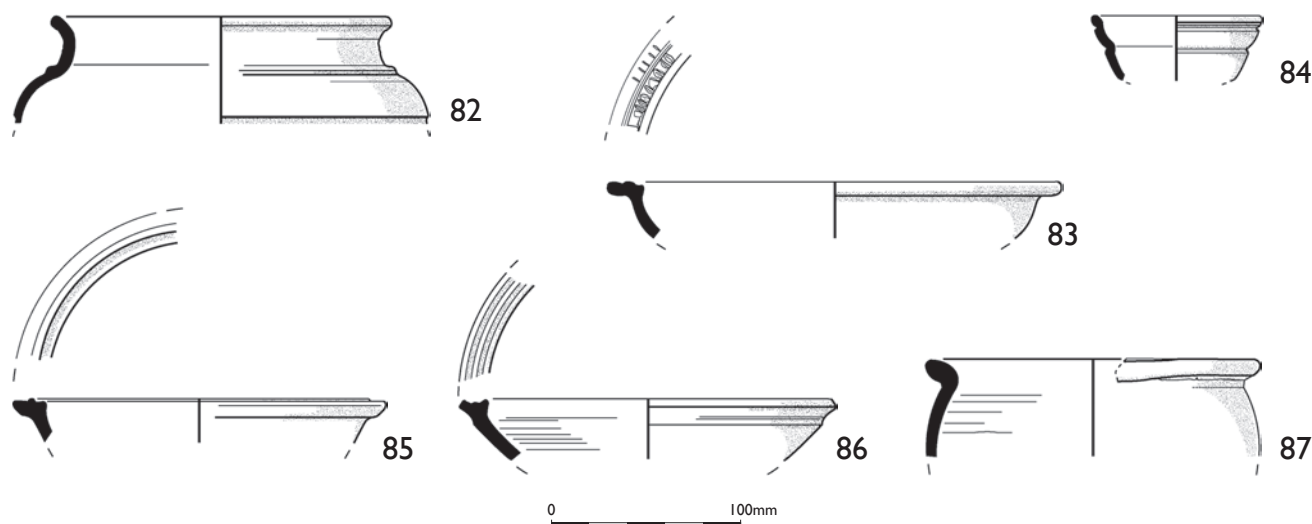


Fig 280 Roman pottery from Phase 16 Cat nos 82–87.

83 Dish in coarse orange ware, possibly Wilderspool fabric. Cordon of decoration on 'flat' rim, similar to pie crust with irregular ?knife marks. Chester fabric ?151, form 1417. B (2136): Post Roman Phase; SF 9937. Late 1st–early 2nd century. Fig 280.

84 Cup in fine orange mica-coated fabric. Imitation of samian form Dr 27. Chester fabric 467, form 717. B (2145): Post Roman Phase; SF 9938. Cf Grimes 1930, fig 70 no 166. Late 1st–early 2nd century. Fig 280.

85 Flanged bowl in orange mica-coated fabric. Raised ridge running around centre of rim. Surface flaking. Chester fabric 467, form 1419. B (2244): Post Roman Phase; SF 9939. Cf Hinchliffe and Williams 1992, fig 80 no 676. Late 1st–early 2nd century. Fig 280.

86 Dish in orange mica-coated ware with a grey core. 'Lid-seated' rim; concave just below rim on interior. Chester fabric 209, form 1420. B (2294): Post Roman Phase; SF 9946. Late 1st–early 2nd century. Fig 280.

87 Jar in coarse grey ware. Thick everted rim, misfired giving an uneven rim. Grey/brown fabric with a rough feel and a hard grey core. Chester fabric 108, form 1421. B (2294): Post Roman Phase; SF 9949. Fig 280.

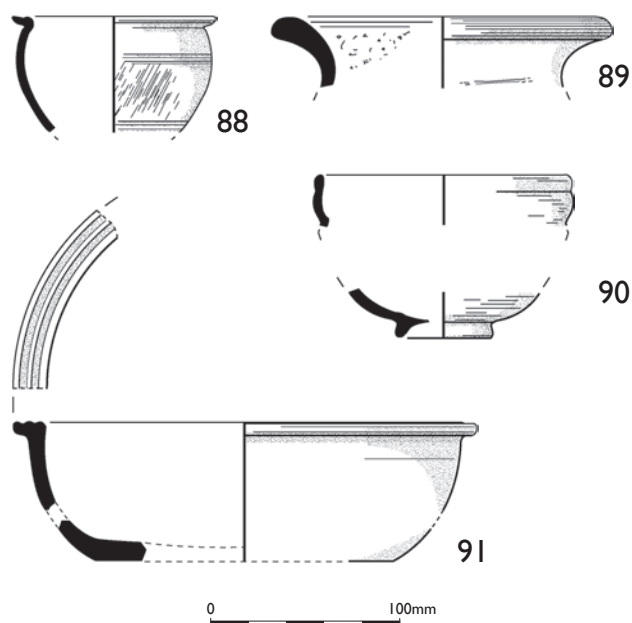


Fig 281 Roman pottery from Phase 20 Cat nos 88–91.

rouletting and two girth grooves. Chester fabric 193, form 1422. B (2002): Post Roman Phase; SF 9934. Late 1st–early 2nd century. Fig 281.

89 Wide-mouthed jar in coarse orange ware. Flaring rim. Thick-walled with a grey core. Burnished. Chester fabric 194, form ?752. B (2002): Post Roman Phase; SF 9935. Late 1st–early 2nd century. Fig 281.

90 Rim of cup in fine black-surfaced ware. Some iron staining. Possible imitation samian form Dr 27. Chester fabric 203, form 1423. B (2002): Post

Phase 20

Catalogue

88 Bowl/beaker in coarse grey ware. Everted rim with burnishing beneath. Buff/brown fabric. Band of

Roman Phase; SF 9975. Late 1st–early 2nd century. Fig 281.

- 91 Dish/bowl in fine orange mica-coated ware. Reeded rim. Flat base and slightly sooted. Mica coating mainly on inside of vessel. Chester fabric 466, form 1140. B (2002): Post Roman Phase; SF 10102. Late 1st–early 2nd century. Fig 281.

Discussion

The general character of the Roman pottery assemblage from the amphitheatre – its provenance, ware types and vessel forms – are typical of the pattern of pottery acquisition and use at Chester. The supply to the fortress in the late 1st century was dominated by locally-made reduced, oxidised and black-on-brown fabrics as seen in the standard later 1st-century forms – the flanged and carinated bowls, everted rim jars, flanged- and plain-rimmed dishes. Imported south Gaulish samian, and mortaria from the *Verulamium* region and to a lesser extent north Gaul are also evident. The 2nd century brought central Gaulish samian and saw the arrival of Dorset BB1 type 1, used alongside the cooking pots, bowls and dishes in local fabrics. Mortaria, flagons and beakers from the kilns at Wilderspool and Wroxeter make an appearance at this time – products which then declined in the second half of the 2nd century. Imported fine wares are dominated by samian table wares which account for 10.3 % by sherd count and 4.3 % by weight of the whole assemblage, 8.6 % by sherd count and 4.7 % by weight from Roman phases.

Fine wares from the Rhineland and the Nene Valley became part of the suite of vessels and the locally-made mortaria were replaced by those from Mancetter-Hartshill, Warwickshire in the late 2nd and 3rd centuries. Typically, the 4th century saw the shell-tempered vessels taking the place of black-burnished cooking pots and bowls. These late Roman vessel types are few in number and absent from the Roman phases at the amphitheatre, only appearing residually in the post-Roman layers and features. The make-up of the assemblage fits the general trend as suggested by Timby (2012, 63–5) in her comparisons between Chester, Gloucester, Wroxeter and Carlisle, that settlements on the western side of Britain were receiving a similar range of continental and regional traded wares.

The high level of residuality within the assemblage suggests that little of the pottery is directly associated with the use of the amphitheatre itself, having being brought to the site from elsewhere in the fortress or *canabae*. This is particularly true of the seating bank material of Phase 6, the construction of the Amphitheatre 1b seating bank. A small percentage of pottery (only 4 % by sherd count and 3 % by weight) was recovered from the cultivation soils and occupation deposits of the pre-amphitheatre phase, and a very small quantity of pottery was recovered from the

primary seating bank of Amphitheatre 1a – just seventeen sherds (54 g), reflecting the origin of this material as natural deposits derived from the excavation of the arena.

It is Phases 5 and 6 (the use of Amphitheatre 1a and the construction of Amphitheatre 1b) from which the majority of the pottery comes – 35.2 % and 43 % by sherd count and 33.3 % and 44 % by weight respectively. This is from deposits immediately outside the wall of Amphitheatre 1a, pits in the south-western and north-eastern areas of Area A – and a large assemblage from the widespread layer (625). In fact the character of the large assemblage of pottery from the latrine pits of Phase 5, possibly in use by visitors to the amphitheatre, is one typical of ‘household rubbish’. Pottery associated with the construction of Amphitheatre 1b is primarily from the outer ring beam and radial beams, from around the base plates and uprights, as well as re-deposited layers, presumed to have come from the arena. The vast majority of the pottery from the construction of Amphitheatre 1b is from the seating bank material (88.2 % by sherd count and 92.8 % by weight), presumed to be re-deposited material derived from the fortress and/or the *canabae*.

A small percentage of pottery (14.6 % by sherd count and 12.6 % by weight) was recovered from those features associated with the use of Amphitheatre 1b – the road surfaces and patches and the dumped material sealing the road edge. There are also small groups of small sherds in a poor condition from the post-holes and possible associated floor surface of a short-lived timber building or stall in this Phase, with considerably more coming from the episode of clearance and dumping around the amphitheatre. There is a small group of pottery from the possible shrine (17.5 % by sherd count and 12.9 % by weight of the pottery from this Phase). Most of the sherds relate to two vessels; a hard fine grey ware beaker (Cat no 62) and an orange mica-coated ?flagon/beaker, though we cannot be totally certain that these vessels were related to the shrine in use. The material from the sand dumped against the wall of the amphitheatre is difficult to interpret given that the deposit was either imported for use in the arena or had been removed from the arena.

The pottery from the Phases of construction and use of Amphitheatre 2 amounts to 129 sherds (2,730 g) and comes from the construction trench, *vomitorium*, the outer wall foundation and road levelling and re-surfacing episodes.

It is interesting to compare the pottery evidence from other British amphitheatres, of which four have been excavated on a large scale – urban examples in London, Silchester and Dorchester, and the legionary amphitheatre at Caerleon. London and Caerleon in particular have produced large pottery assemblages.

Much of the pottery from the excavations of 1992 and 1999 in London came from levelling dumps as well as drain and pit fills outside the eastern entrance meaning that, as at Chester, little pottery was associated with the amphitheatre itself. The pottery was dumped over a relatively short period

of time as infill and is associated with other waste materials and glass cullet, and dates to the mid-late Trajanic period (c AD 110–120). In contrast to the Chester assemblage many vessels are largely complete and include a large quantity of fine wares in exotic and utilitarian forms (Richardson 2008, 134–5). The assemblage is not typical of domestic rubbish and the lack of any wasters and evidence of use on the vessels suggests that the material was not being dumped from local kilns. Various suggestions have been put forward: that the assemblage could be the result of feasting or ceremonies associated with the use of the amphitheatre; vessels were taken in to the arena shows by spectators; or it may be a ‘military assemblage’ associated with the nearby Cripplegate fort, excavation of which has produced very little pottery (*ibid*, 134).

The suggestion of feasting vessels is inconclusive, although the proportions of so-called ‘ritual’ vessels such as *paterae*, wine strainers and certain types of flagons are above average, there may be other reasons for their presence. It therefore appears likely that the amphitheatre assemblage, which has an unusually high percentage of local kiln products including reduced and oxidised vessels of the first half of the 2nd century (a trend also seen at Caerleon, Chester and York) is a military assemblage, dumped as hard core during the rebuilding of the amphitheatre (*ibid*, 135).

The pottery from the amphitheatre at Caerleon was mainly recovered from spoil that had been imported to build up the entrance ways and it is suggested that the material derived from the fortress. The vessels published in 1928 are those from ‘well-marked’ groups, dated by associated finds (Wheeler and Wheeler 1928, 178–88). The range of

forms described includes flanged bowls, shallow dishes, beakers, tazze, jars, jugs/flagons, mortaria and amphorae – all comparable to those from Chester. Many of the vessels are described as being ‘legionary’ ware dated to the first half of the 2nd century. These have a fine hard orange fabric with a glossy dark orange surface – a product of legionary kilns somewhere within easy reach of the fortress. Although pottery and other finds contemporary with the building of the amphitheatre are few and far between, there is enough from the building levels to give a consistent *terminus post quem*, including the presence of a late 1st-century coin, for a date of construction – suggesting that the amphitheatre was built during the Flavian period. It is suggested in the report that the pottery which accumulated subsequently to the building of the amphitheatre and on the surface of the seating bank ‘was brought there in the picnic-baskets of spectators’ (Wheeler and Wheeler 1928, 147). The picnic ‘crookery’ in question was a samian bowl and beaker, a coarse ware flagon and bowls with reeded flanges. The pottery also supports the coin evidence for dating subsequent repairs to several entrances. The reconstruction phase, following a period of destruction and neglect, produced a relatively small group of pottery dating to the second half of the 2nd century and was thought to have been brought in by the builders from rubbish dumps etc, whereas the pottery that was contemporary with this phase of activity was dated to the 3rd century. Pottery on amphitheatre sites thus appear, like that from Chester, to consist largely of material imported for the purposes of building.

ROMAN GLASS VESSELS

By Gillian Dunn

Introduction

A total of 671 fragments of vessel glass was recovered from Areas A, B and C. This equates to 412 from Roman phases, 252 from post-Roman phases and seven which are unphased (see Table 63).

The vast majority of the glass falls within the date range of mid-1st to late-2nd century and in many cases only a broad date of 1st to 3rd century can be assigned. There is very little obvious late Roman material. A high proportion of the assemblage is re-deposited material which is reflected in the small size of the fragments. A total of 340 fragments (82.5 % from Roman phases) was recovered from processed soil samples.

The glass is generally in good condition with relatively little weathering or scratches but there are examples of strain cracks, pitting and impurities embedded within the glass. Several fragments show tool marks and there are two possible examples of grozing, suggesting some re-working. A small percentage has obviously been heat affected. It is unfortunate that 60 % of the fragments from Roman phases are body fragments, which, coupled with the high degree of fragmentation, reduces the certainty of vessel form identification. A fairly large proportion (33 %) are just tiny chips or slivers of glass.

Methodology

All of the glass has been recorded by fragment count for each vessel form, by colour, within each layer. Rim and base diameters, thickness and height of vessels have been recorded where appropriate.

The terminology for the colour of the glass used here is based on that of Cool and Price (1995, 7–8). Where two colours are given eg yellow/brown, it is the last colour that predominates. Where it has been difficult to define the different shades of pale green, the categories of light green and yellow/green are used for the more pronounced shades, and pale green for the shade closest to colourless. If slight traces of green can be seen in the section, then the fragment is described as green-tinged colourless. Blue/green refers to the naturally coloured glass and no distinction is made if there is slightly more green than blue. The condition and the presence of any decoration, surface marks or cross-joins have also been recorded.

All of the polychrome and facet-cut vessels have been catalogued along with other selected vessels from Roman

phases. Only those vessels of intrinsic value from the Post-Roman phases have been catalogued.

Colour

Although there is a range of colours represented in the assemblage, 63 % from Roman phases (by number of fragments) are blue/green, a colour in common usage for containers and tableware from the 1st to 3rd centuries (Table 64). A similar proportion is evident for all the Roman glass

Table 63 Number of glass vessel fragments from Roman phases.

Phase	No of vessel fragments
1	-
2	-
3	8
4	-
5	156
6	205
7	39
8	2
9	2
Total	412

Table 64 Glass colours represented in the assemblage (Roman phases).

Phase	No of vessel fragments
Blue	7
Blue/green	259
Colourless	65
Green-tinged colourless	11
Light blue	1
Light green	33
Pale green	13
Polychrome	13
White	1
Yellow/brown	1
Yellow/green	7
Yellow-tinged colourless	1

from the site, with 70 % of the total assemblage being blue/green. Colourless and lightly-tinted glass, dated to the Flavian period onwards and used for finer tableware vessels, accounts for 17 % of the total assemblage, 18.7 % of the glass from Roman phases.

Polychrome vessels make up 5 % of the whole assemblage, 3 % of the vessels from Roman phases. Blue glass, dating to the 1st–early 2nd century, is represented by just eight small ‘chips’ or slivers from Phases 5, 6 and 11a. Light green and pale green fragments make up 10 % of the total assemblage (11 % from Roman phases) with the stronger coloured glass of yellow/brown, yellow green and white accounting for 2 % of the assemblage, with all but one of the fragments coming from Roman phases.

The only colour represented in a Post-Roman phase but not present in a Roman phase is one convex curved body fragment of an amber coloured vessel from (3075).

Forms

There is a fairly limited range of vessel forms, which is reflected by the fact that a high percentage of the assemblage was recovered as part of the extensive sampling programme, resulting in less diagnostic fragments, just a few millimetres in size. However, it is clear that of those identifiable vessels, it is bottles and bowls that dominate (Table 65). Bottles, serving as all-purpose containers, account for 62 % (56.3 % from Roman phases) of those fragments that can be identified to vessel form. However, it must be remembered that it is precisely these thick-walled vessels that are more likely to survive re-deposition episodes than many other vessel forms. However, there appears to be no significant difference in the layers in which the finer tablewares and the more robust bottles were deposited ie pit fills, the seating bank, areas of dumped sand, robbing episodes, cobbled surface and layers covering the post-pad structures. Most prevalent are the blue/green bottles which were in common use in the late 1st century. The assemblage includes the cylindrical form, which appears to have gone out of use in the early 2nd century – no examples of this type were found in any

Roman phase later than Phase 6, though a complete rim and neck was recovered from a Post-Roman phase (Cat no 37, Fig 286). Prismatic forms (square, rectangular and hexagonal) which are common on 1st- and 2nd-century sites are also present. These mould-blown angular and cylindrical bottles were mass produced in a range of sizes and used for the transport and storage of liquids or semi-liquids. There are eight examples of bottles that have moulded decoration on their base (all on prismatic forms). Six of them are parts of circular mouldings but one is thought to be a decorative ‘star’ (Cat nos 27 and 35, Fig 286). These concentric circles are a common motif on bottles and may have been a way of strengthening their bases.

Bowls and dishes account for 24.4 % of the assemblage and are dominated by the polychrome types from Phases 5, 6 and 10. One of the earliest forms in the assemblage is the pillar-moulded bowl, a type that had gone out of use by the end of the 1st century. Surprisingly, only three fragments of this very common type are present and were found in Phases 5 and 6, blue/green and yellow/brown in colour, with a fourth fragment coming from a Post-Roman phase (Cat nos 15 and 34). Two of the fragments of deep blue glass represent the rolled rim of a 1st–2nd-century bowl, found in a Post-Roman phase (Cat no 24). There is also a colourless bowl with a moulded vertical rib from Phase 3, (1091), a possible occupation layer; and the base ring of a blue/green bowl from the seating bank in Phase 6, (2513).

Beakers and cups make up 6.5 % of the assemblage. In addition to the conical facet-cut forms there are green-tinted colourless examples with cracked off and ground rims (Cat no 5). Only six fragments could be identified as flasks comprising base and body fragments of blue/green vessels and the ribbon handle of a possible flagon or flask (Cat nos 13, 14, 22 and 26). Jars and jugs form just 4.5 % of the assemblage, represented by base, body and handle fragments in light green, yellow/green and blue/green glass (Cat nos 12, 25 and 39).

Two high-quality tablewares of the 1st and 2nd centuries are represented in the assemblage – polychrome dishes and facet-cut beakers.

Table 65 Roman glass vessel forms.

Vessel type	% of fragments identifiable to form (all phases)	% of fragments identifiable to form (Roman phases)
Cylindrical bottles	8.9	8.3
Prismatic bottles	17.9	18
Indeterminate bottles	35.1	30
Bowls/dishes	24.4	30
Beakers/cups	6.5	8
Flasks	3.6	3
Jugs	3	-
Jars	-	1.5

Polychrome vessels

Thirty-nine fragments of cast polychrome vessel glass were recovered from the excavations, thirteen of which are from Roman phases. Almost a third are from Phase 10, (2610), a layer which covered the two post-pad structures. The majority of those from Roman phases are from Area B Phase 6 seating bank deposits (twelve fragments) and one fragment is from the cess pit in Phase 5, (1216), thought to have been in use during the lifetime of Amphitheatre 1a (Cat no 2). Where the vessel form can be identified the fragments appear to derive from shallow dishes or bowls with wide everted rims with an overhang. The bases are flat with slightly diagonal footrings (Cat nos 7, 17, 23 and 31; Figs 283, 285). Most fragments are very weathered but the original colours were predominantly emerald green and yellow, sometimes with highlights of red. The majority have an emerald green ground with yellow swirls/canes and/or spots of yellow and a smaller proportion have a floral or rosette pattern (possibly with a red centre) and petals outlined with yellow. A single body fragment, in a much better state of preservation, is opaque white, lilac and blue. It is suggested that, based on the different styles of decoration, a minimum of three vessels are represented.

Vessels with patterns in green and yellow with red highlights are common amongst 1st-century AD polychrome vessels but this colour combination is also found later, in the 2nd century, in bowls with horizontal rims and base rings. The cane patterns change over time, the flower canes with petals edged in yellow and a central spot often in another colour, and the simple yellow flecks, or rings, in dark green, often belong to the 2nd century AD (Price 2002). The form and decoration of the green, yellow and red fragments from the amphitheatre assemblage are consistent with an early 2nd-century date (Price 2002). Similar vessels have been found at Catterick (Cool and Price 2002, 220 no 3, fig 333) and Caerleon (Allen 2000, 425 no 2, fig 109). Few examples have previously been recorded from Chester – excavations in Crook Street in 1963 produced a rim and upper body fragment of a bowl with a six-petalled flower decoration (unpublished) and the site at Abbey Green, excavated in 1975–8, produced two small body fragments (unpublished). There is also one body fragment of a hemispherical bowl from Delamere Street (Cool 2012b, 89). The Abbey Green and Delamere Street fragments are comparable to those from the amphitheatre.

Analysis of the polychrome glass

By Sarah Paynter and Nadine Schibille

Eleven fragments of polychrome glass from the assemblage were sampled, mounted and analysed using a scanning electron microscope with attached energy dispersive spectrometer. This included the single lilac, white and blue fragment (SF 9658), several fragments featuring red highlights (SFs 8366, 8295, 8834 and 7306) and the remainder with yellow decoration on a green ground (Table 66).

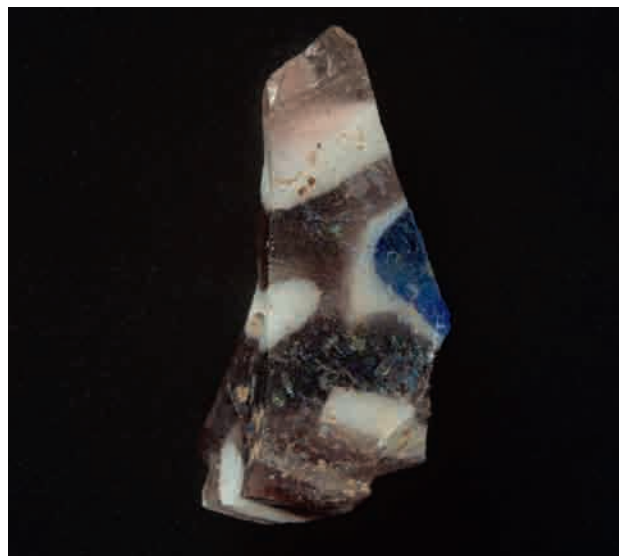


Fig 282 Body fragment of cast polychrome vessel. Translucent lilac ground with translucent blue spot surrounded by opaque white (Cat no 2).

Results

LILAC, WHITE AND BLUE SF 9658 (Fig 282)

The white glass is opaque due to the tiny crystals of white calcium antimonite. The calcium levels in the white glass are similar to contemporary transparent glass, so it is unlikely that any extra calcium oxide was introduced. The distinctive shape of the crystals also indicates that they precipitated in the glass, rather than being made beforehand. This suggests that the opaque white glass was probably made by adding an antimony compound to a remelted batch of transparent glass; the antimony compound reacted with calcium from the glass itself to produce the calcium antimonate. Calcium antimonate was the standard opacifier in Roman glass, with a long history of use in many regions, particularly Egypt and the Near East (Mass *et al* 1998). The lilac colour was produced by adding manganese oxide. Unfortunately the sample from this fragment did not include any of the dark blue glass, but the colour is common and was produced using cobalt oxide.

Both the lilac and white glass have been produced by adding colourants to a base glass that has a low ratio of soda to lime and also elevated levels of alumina. These characteristics are typical of manganese decolourised natron glass (scientific analysis and documentary accounts agree that most of the glass in circulation in the Roman period was made from sand and natron), which ranged from colourless to ‘naturally coloured’ blue-green (Jackson and Paynter 2015).

YELLOW GLASS

The yellow glass (Fig 283) is coloured with lead antimonate, which is again typical for the Roman period (Turner and Rooksby 1959). The crystals responsible for the colour are soluble in the glass, so were made beforehand by heating

Table 66 The analysed fragments of polychrome glass.

Context	SF No	S'ple No.	Colour	Na ₂ O	MgO	Al ₂ O ₃	SiO ₂	P ₂ O ₅	SO ₃	Cl	K ₂ O	CaO	TiO ₂	MnO	Fe ₂ O ₃	CuO	SnO ₂	Sb ₂ O ₅	PbO
2001	8366		Y	17.48	0.57	2.45	61.60	bd	0.40	1.28	1.21	3.38	0.18	0.58	1.30	1.12	bd	1.27	7.01
			R	14.57	2.42	2.91	53.69	0.85	0.25	1.34	1.40	9.12	0.23	0.47	2.16	1.78	0.48	0.67	7.66
			G	16.58	2.74	1.96	61.33	0.95	0.32	1.17	1.64	7.14	0.19	1.04	1.49	2.02	0.30	0.44	0.67
2612	8835	4381	R	14.10	2.38	2.70	52.10	0.77	0.33	1.37	1.31	9.23	0.22	0.40	2.00	1.69	0.47	0.90	9.90
			G	16.57	2.73	1.95	61.17	0.90	0.23	1.13	1.78	7.02	0.12	1.13	1.56	2.13	0.40	0.43	0.73
2430	8295		Y	17.12	0.60	2.24	62.07	bd	0.37	1.29	1.22	3.84	0.19	0.58	1.55	0.96	0.07	1.44	6.38
			R	16.83	2.68	2.48	57.28	1.06	0.35	1.24	1.30	8.43	0.19	0.52	2.22	0.90	0.67	0.44	3.38
218	7306		Y	18.33	0.55	2.52	61.68	bd	0.46	1.33	0.82	3.01	0.21	0.60	1.12	0.46	bd	1.13	7.61
			R	14.44	2.38	2.82	52.25	0.74	0.28	1.35	1.33	8.98	0.27	0.38	1.95	1.82	0.61	0.85	9.57
			G	17.60	1.47	2.31	61.47	0.38	0.40	1.23	1.16	4.60	0.20	0.73	1.24	1.09	0.20	0.89	5.02
2542	8462		Y	17.69	0.57	2.48	61.31	bd	0.47	1.30	1.22	3.07	0.21	0.63	1.12	1.20	bd	1.08	7.53
			G	16.25	2.95	1.95	61.15	0.97	0.30	1.10	1.77	7.29	0.17	0.98	1.45	2.21	0.33	0.42	0.67
2435	8792		Y	18.47	0.53	2.66	61.58	bd	0.49	1.34	0.81	3.01	0.24	0.60	1.19	0.33	bd	1.08	7.56
			G	16.29	2.97	1.94	61.26	1.02	0.31	1.11	1.75	7.29	0.17	0.97	1.44	2.17	0.30	0.37	0.64
2430	8295		Y	18.44	0.52	2.49	62.18	bd	0.44	1.33	1.00	3.04	0.18	0.57	1.09	0.64	bd	1.04	6.96
			G	16.50	2.97	1.92	61.28	0.97	0.30	1.08	1.69	7.30	0.19	0.95	1.47	2.04	0.35	0.37	0.62
			R	16.83	2.68	2.48	57.28	1.06	0.35	1.24	1.30	8.43	0.19	0.52	2.22	0.90	0.67	0.44	3.38
2513	8834	4382	Y	7.30	0.56	1.86	20.94	bd	0.39	0.53	0.57	3.00	0.54	0.27	7.44	0.86	6.34	16.71	32.57
			R	16.03	2.70	2.62	55.85	1.28	bd	1.26	1.46	9.02	0.21	0.58	2.19	2.18	0.79	0.61	3.02
			G	17.29	2.53	2.07	61.30	0.84	0.32	1.25	1.63	6.66	0.18	1.13	1.39	1.99	0.23	0.39	0.73
1216	9658	4784	L	15.77	0.47	2.63	69.42	bd	bd	1.35	0.61	7.80	bd	1.96	0.32	bd	bd	0.12	0.03
			W	14.47	0.41	3.98	66.90	0.14	0.45	0.76	0.65	6.97	bd	0.55	0.44	bd	bd	4.74	0.16
2610	8801		G	15.75	2.95	2.27	60.87	0.95	0.32	1.11	1.84	7.40	0.19	0.96	1.54	2.28	0.39	0.50	0.65
2397	8128		G	16.52	3.02	1.92	61.28	0.95	0.30	1.11	1.67	7.24	0.13	0.96	1.49	2.03	0.25	0.35	0.68

Composition of polychrome glass (average of 1 to 8 SEM-EDS analyses each, normalised, wt% oxide), G = green, Y = yellow, R = red, L = lilac, W = white, bd = below detection limit.

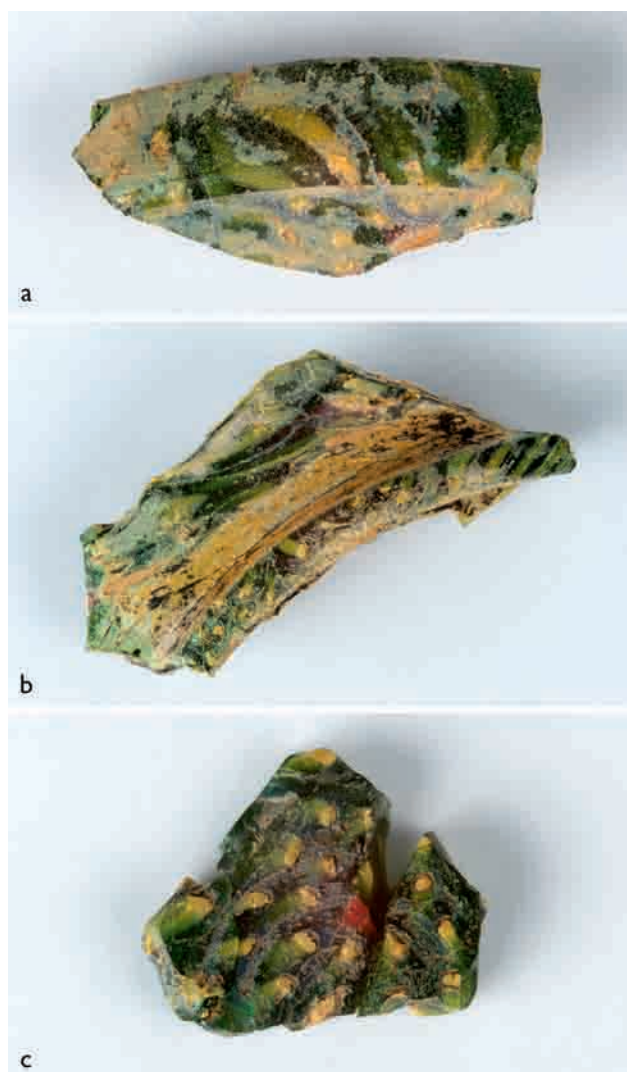


Fig 283 Polychrome mosaic vessel glass: (a) overhang rim (Cat no 9), (b) base fragment (Cat no 17i), (c) body fragment (Cat no 23)

together compounds of lead and antimony in a ceramic vessel to make a yellow glassy mixture (Paynter *et al* forthcoming; Shortland 2002). In this case, the yellow colourant has been added to a natron base glass, but the composition is unusual because the ratio of soda to lime is higher than most of the typical natron glass compositions in circulation at this time.

RED AND GREEN GLASS

The red and green glass (Fig 283) in each case contains elevated levels of potassium, magnesium and phosphorus, which indicate that plant ashes were incorporated into the glass (Jackson and Cottam 2015; Turner 1956). These distinctive red and green glass compositions have also been identified amongst monochrome vessels, *tesserae* and enamel of the Roman period in Britain, continental Europe and further afield, including Egypt (Gratuze 2007; Lemke 1998).

The Roman plant ash compositions all share certain traits that distinguish them from the plant ash glass of both earlier and later periods, however, in particular the level of phosphorus oxide is higher, whereas the levels of potassium and magnesium oxides tend to be slightly lower (Shortland and Eremin 2006). This suggests that a different type of plant ash was used to make the red and green glass of the Roman period compared to earlier and later periods.

The colour of the emerald green glass is due to copper oxide as CuO. In contrast the colour of the red glass is due to very small crystals of copper oxide (Cu₂O) or metallic copper.

In addition to copper, the red glass contains small amounts of tin and traces of zinc, which are found together in copper alloys of the period and so the red colourant maybe a metalworking by-product. The red glass also contains lead oxide, aluminium, calcium and iron oxides. A possible source for this complex combination of elements is the red glassy waste slag from the refining of debased Roman silver alloys (Rehren and Kraus 1999).

Conclusions

The chemical analysis of the coloured glass used to make these vessels has highlighted some significant compositional differences. The lilac, blue and white vessel fragment, which was recovered from the fill of a rubbish pit in Phase 5, was made by adding colourants to a manganese-glass. Manganese decolourised glass is thought to originate from the Syro-Palestine region but its use was widespread over many centuries and the colourants could potentially have been added at any workshop with access to this glass type. The lilac, white and blue colours are relatively easy to produce and fairly stable during working.

In contrast the red, green and yellow polychrome vessels are technically more difficult to make as these glass colours will spoil if the colourants oxidise or dissolve. The yellow colour in the fragments was made from an unusual base glass composition containing an atypically high ratio of soda to lime. This has not been noted before in yellow *tesserae* (Paynter *et al* 2015) but is a feature of yellow glass in a small number of other polychrome vessel fragments (Gratuze 2007). The green and red glass in the Chester polychrome vessels contained a plant ash component and their compositions are comparable to contemporary green, dark green-black and red glass. The most similar examples are found in other polychrome fragments (Gratuze 2007), which is potentially a chronological distinction since many of the other published analyses for green glass are for monochrome vessels predating the fragments from the amphitheatre. This distinctive Roman plant ash green glass is thought to originate in Egypt (Jackson and Cottam 2015) and the high ratio of soda to lime found in the yellow glass of the Chester polychrome vessels, is also most consistent with an Egyptian origin (Picon *et al* 2008). The coloured glass used to make the 2nd-century green, red and yellow polychrome vessels found at Chester may therefore have



Fig 284 Facet-cut glass beakers (Cat nos 1, 3, 18).

been made in Egypt, although the assembly of the bowls could have taken place elsewhere. The similar compositions of each colour in all of the analysed fragments supports the suggestion that only a small number of vessels are represented.

A full report on the polychrome vessels is/will be published in Edwards and Paynter (forthcoming).

Facet cut beakers

Seven fragments of facet-cut vessels were recovered (Figs 284, 285), four of which are from Roman phases. They were found in the same features as the polychrome vessels ie the cess pit in Phase 5, Phase 6 Area B seating bank, the layer over the post-pad structures of Phase 10 and an 18th-century pit fill. Popular during the Flavian and Trajanic periods, these are blown vessels, the wheel cutting taking place once the vessel was cold, using a rotating stone or metal wheel. The facets here are cut in diamond, hexagonal and teardrop shapes, arranged in rows (Figs 284, 285). Charlesworth (1959) has suggested that the slight differences in size and spacing of the facets, indicates that they were made in more than one place. There are examples from other Chester assemblages including the sites at Abbey Green, Goss Street, Crook Street, Northgate Brewery and George Street (all unpublished) as well as Nuns Field (Cool 2012c, 183), Deanery Field (Newstead 1924, 74–5, Pl VIII) and

Infirmity Field (Thompson 1962b, 3, fig 2). It is also worth noting that two fragments were recovered from the amphitheatre at Caerleon, from a context dated to *c* AD 100 (Wheeler and Wheeler 1928, 170, pl 34, nos 5, 6).

Summary

More than half of the glass (62 %) is from Phases 5 and 6, coming from the final layer associated with the use of Amphitheatre 1a, (625), from the cess pit (1256), from the seating bank and from material deposited around the base plates as packing. This suggests that it is coming from re-deposited material, probably from within the fortress.

There is a mixture of utilitarian forms, with a range of bottle types, contrasting with the fine tableware such as the ground colourless and facet-cut beakers, which is a typical make-up of glass assemblages from Chester fortress sites occupied during the late-1st to early-2nd centuries (Cool 2012b, 87–9, table 2.15). The one feature which may have been expected to have produced some distinctive vessels associated with the use of the amphitheatre is the shrine, but this yielded only eight fragments of vessel glass, many just tiny slivers recovered from samples.

Previous excavations at the amphitheatre have produced very small quantities of glass. A small group of vessels was published by Thompson (1976, 198 and 200, fig 32) which includes cylindrical and square bottles in blue-green and yellowish-green glass, a ribbed jar or flagon in amber glass and colourless and blue-green flasks. A single ribbed flagon handle, similar to the one found in Area B in a Post-Roman cultivation soil, was found in the seating bank and a tubular-rimmed bowl in a greenish glass came from Pit F9. All of these vessels fall within a date range of late 1st- to mid-2nd century. Excavations carried out between 2000 and 2003 yielded ribbed vessels, square and cylindrical bottles and flasks.

The trenches excavated by Lancaster University Archaeological Unit produced 53 fragments of Roman vessel glass. Only one of these appears to be from a Roman phase – a 2nd–3rd-century body fragment of a thin colourless blown vessel with two abraded horizontal lines (Trench 9, context 140).

Excavations and subsequent watching briefs by Gifford in 1999–2001 produced eighteen fragments described as clear and blue-green and including square bottles, a possible bowl and a possible unguent bottle.

Catalogue

The following abbreviations are used in the catalogue: WT=wall thickness; PH=present height, BD=base diameter, RD=rim diameter, th=thickness

Phase 5

- 1 Beaker. Body fragment of facet-cut conical beaker with a step in towards the base. Deeply-cut

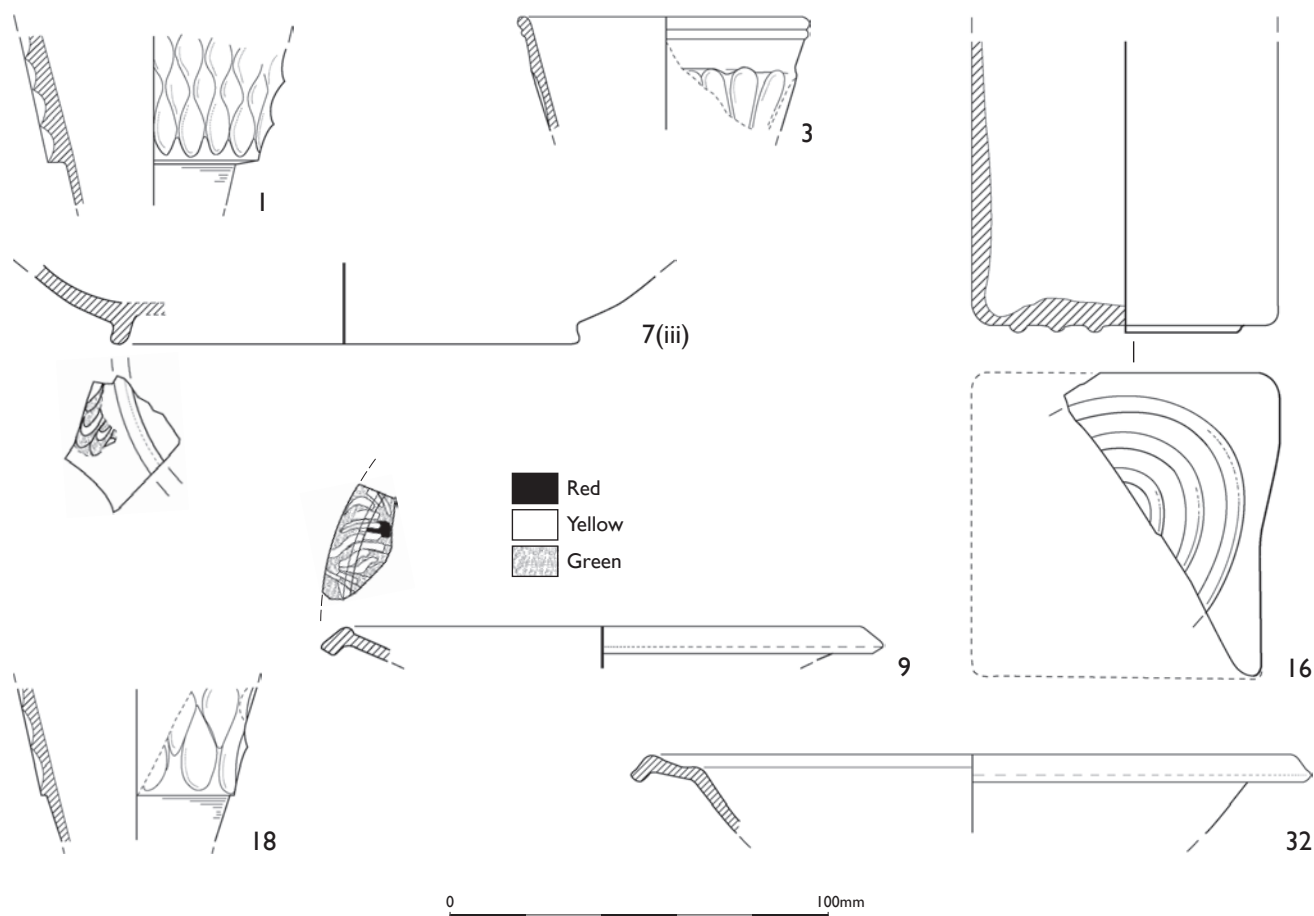


Fig 285 Roman vessel glass Cat nos in range 1–32.

diamond-shaped facets in horizontal rows. The base of the facets on the lowest row are rounded. Glossy on inside, ground on the outside. Green-tinged colourless; WT 1.5–7 mm; (625): Phase 5 widespread layer; SF 8632. See Price and Cottam 1998 Plate 4, no 2. Similar to SF 8808 but facets are smaller. Mid 1st–mid 2nd century. Figs 284, 285.

- 2 Body fragment of cast polychrome vessel. Translucent lilac ground with translucent blue spot surrounded by opaque white. Opaque white flecks; WT 3–4 mm; A (1216) Sa <4784>: Phase 5 cess pit fill; SF 9658. Fig 282.
- 3 Beaker. Rim fragment of facet-cut beaker. Oval-cut facets in horizontal row. Edge-fired rounded rim with groove beneath and parallel thickening. Plain beneath rim with decorative zone below. Some bubbles. Green-tinged colourless; PH 30 mm, RD 80 mm, WT 2.5–3 mm, *c* 18 % of rim; A (1216): Phase 5 fill of cess pit; SF 9663. Mid 1st–mid 2nd century. Figs 284, 285.
- 4 Bowl. Base fragment of blue/green ribbed bowl. Two ribs present which finish just underneath the base. Ribs worn, base slightly concave. Bubbles;

PH 19 mm, base th 2.5–3 mm, WT 1.5–2 mm; A (1202): Phase 5 fill of cess pit; SF 10017. 1st cent.

- 5 Rim fragment of green-tinged colourless cup or beaker. Rim cracked off and ground. Horizontal abrasion marks on external surface; PH 11.5 mm, WT 1 mm; A (1202): Phase 5 fill of cess pit; SF 10018.
- 6 Bowl. Body fragment with part of a moulded rib. Blue/green; WT 1.5 mm, rib th 4.5 mm; A (1073): Phase 5 ?floor surface; SF 10019. 1st century.

Phase 6

- 7 Bowl; nine fragments of cast polychrome mosaic – two rims, three bases (two of which join) and four body fragments; B (2542): Phase 6 seating bank deposit; SF 8462.
 - i) part of overhang from rim (for form see Price and Cottam 1998, 55 and Fig 13b). Translucent emerald green ground with yellow flecks. Flaking iridescence; WT 3 mm. Similar to vessel from site at Abbey Green, Chester Tr IV context (770) (unpublished).
 - ii) part of rim and body. Floral mosaic. Flaking

- iridescence. Translucent emerald green ground with translucent ?blue and opaque yellow dots. Ground has weathered more than the rods; WT 3 mm.
- iii) 2 joining base fragments with diagonal foot ring. Heavily weathered. Translucent emerald green ground with yellow flecks and opaque yellow dots; PH 20 mm, WT 3 mm, BD *c* 90 mm. Fig 285.
 - iv) base fragment with diagonal foot ring. Heavily weathered. Translucent emerald green ground with opaque yellow and red swirls; PH 15 mm, WT 3 mm.
 - v) four body fragments, all heavily weathered with flaking iridescence. All appear to have translucent emerald green ground with opaque yellow swirls; WT 3 mm.
- 8 Body fragment of cast polychrome mosaic vessel. Heavily weathered. Opaque green ground with opaque ?red flower centre surrounded by ?petals outlined with opaque yellow. Convex curved body; WT 1.5 mm; B (2513) Sa <4382>: Phase 6 seating bank deposit; SF 8834.
- 9 Bowl. Part of overhang of rim of cast polychrome vessel. Translucent emerald green ground with opaque yellow flecks and swirls and opaque red canes. Flaking iridescence; RD *c* 130 mm, th 3 mm; B (2612) Sa <4381>: Phase 6 seating bank deposit; SF 8835. ?Same as SF 8295, SF 8792 and SF 10010. Figs 283a, 285.
- 10 Body fragment of cast polychrome vessel. Heavily weathered. Translucent emerald green ground with opaque yellow dots and swirls; WT 2 mm; B (2543) Sa <4347>: Phase 6 seating bank deposit; SF 10011.
- 11 Two body fragments of facet-cut vessel. Diamond-shaped facets in horizontal rows. Colourless. Internal cracks and damage to external surface; WT 2–3 mm; B (2543) Sa <4316>: Phase 6 seating bank deposit; SF 10013.
- 12 Base fragment of blue/green ?jar; slightly concave. Iridescent and cracked. ?Melted over broken edge at base/wall junction; PH 5 mm, base th 3 mm (max), WT 2 mm; B (2500): Phase 6 seating bank deposit; SF 10020.
- 13 Base and lower fragment of blue/green flask or bottle. Round bottomed, slightly concave and worn around the edge; iridescent; base th 2–3 mm, PH 18.5 mm, WT 1.5 mm; B (2612): Phase 6 seating bank deposit; SF 10021.
- 14 Ribbon handle fragment of a light green flagon or flask; th 3 mm; B (2498) Sa <4380>: Phase 6 seating bank deposit; SF 10022. 1st–2nd century.
- 15 Bowl. Body fragment of yellow/brown pillar-moulded bowl. Prominent vertical rib with a slightly diagonal slant. Inside surface has grinding marks and is iridescent. Tooling mark on the top of the rib; Translucent; WT 3–5 mm; B (2543): Phase 6 seating bank deposit; SF 10027. 1st century.
- 16 Bottle. Base and part of two sides of blue/green prismatic bottle. Three moulded concentric ‘circles’ on the base, off centre. One wall of vessel slightly indented towards the base; bubbly; L of base 81 mm, th base 2–7 mm, WT 3–7 mm, PH 72.5 mm; B (2543): Phase 6 seating bank deposit; SF 10028. 1st–2nd century. Fig 285.
- ## Post-Roman Phases
- ### Phase 10
- 17 Bowl; twelve fragments of cast polychrome vessel – two base and ten body fragments; B (2610): Post-Roman layer over post-pad structure. Residual; SF 8801.
- i) base fragment with diagonal base ring and flat base. Heavily weathered. Translucent emerald green ground with opaque yellow and red canes. Ground weathered more than rods on base of foot ring; PH 13 mm, WT 3–3.5 mm. Fig 283b.
 - ii) tiny base fragment – junction of wall with foot ring. Heavily weathered. Emerald green ground with opaque yellow swirls.
 - iii) body fragments very heavily weathered. Appear to have translucent emerald green ground with possible petal design but decaying surfaces make this difficult to determine; WT 3 mm.
- 18 Beaker. Body fragment of conical facet-cut beaker with step in towards the base. Large teardrop shaped facets in horizontal rows. Some iridescence. Glossy on inside, ground on outside. Green-tinged colourless; WT 3–3.5 mm; B (2457): Post-Roman layer over post pad structures, residual; SF 8808. Similar to SF 8632 but facets larger. Figs 284, 285.
- 19 Body fragment of facet-cut vessel. Large hexagonal facets in horizontal rows. Some iridescence. Green-tinged colourless; WT 2–4 mm; B (2457) Sa <4359>: Post-Roman layer over post pad structures, residual; SF 10014.
- 20 Ribbon handle fragment from blue/green bottle. Elongated bubbles and impurities; th 6–9 mm; C (3154): Post-Roman pit fill; SF 10024.
- ### Phase 11a
- 21 Body fragment of a blue/green ?bottle. Evidence for a hole (half extant on broken edge). Scratched exterior surface. Convex curved side; WT 2.5 mm, diam of hole *c* 4 mm; A (517): Post-Roman robbing of internal walls; SF 10025.

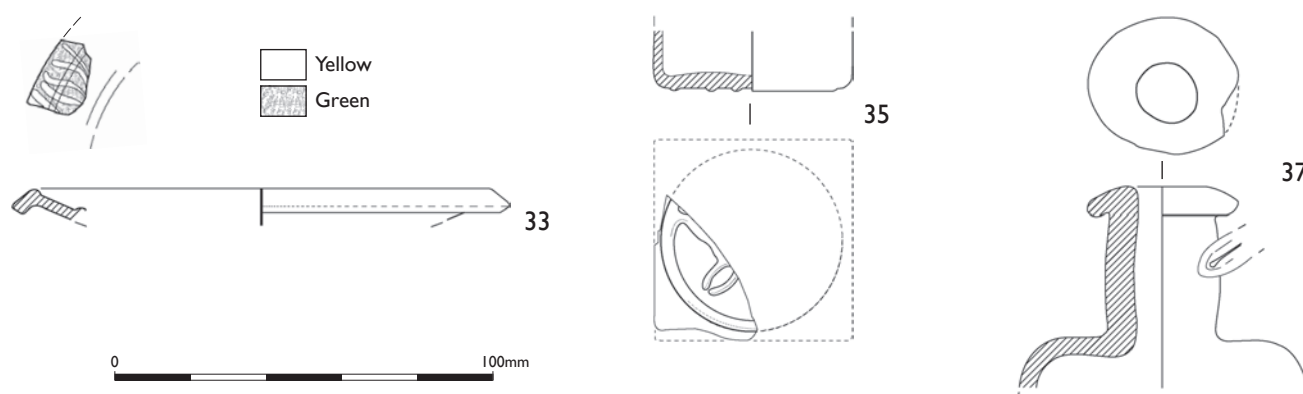


Fig 286 Roman vessel glass Cat nos in range 33–37.

Phase 11b

- 22 Base fragment of blue/green flask. Concave base. Dulled outer surface, very bubbly with impurities/foreign bodies within the glass; PH 20.5 mm, WT 1.5 mm, base th 2 mm; B (2474): Post-Roman robber trench fill; SF 8368. 1st century.

Phase 12

- 23 Three joining fragments of cast polychrome mosaic vessel. Translucent emerald green ground with opaque red central dot surrounded with small opaque yellow dots. Pieces are flat so possible base of a bowl or shallow dish/platter; th 4 mm; A (218) Sa <4031>: Post Roman; SF 7306. Fig 283c.
- 24 Bowl. Translucent deep blue rim and body fragment. Rim edge rolled out and down. Some iridescence and bubbles, some close to the surface giving irregular external surface; PH c 24 mm, RD c 170 mm, WT 2 mm. A (218): Post Roman; SF 10026. 1st–2nd century.
- 25 Jug. Convex curved body fragment of blue/green jug with narrow pinched-up ribs. Iridescent; WT 1 mm. A (218): Post Roman; SF 10029.
- 26 Bottle/flask. Base and wall fragment of blue/green ?cylindrical bottle or flask. Iridescent; WT 2 mm. A (218): Post Roman; SF 10030.
- 27 Bottle. Base fragment of blue/green prismatic bottle. Two right angles either side of a damaged corner. Three concentric circular mouldings, outer one worn; iridescent; base th 5 mm, WT c 4 mm. A (227): Post Roman; SF 10068.

Phase 13

- 28 Small fragment of cast polychrome vessel, possibly from a rim. Translucent emerald green ground with opaque yellow canes; B (2537) Sa <4293>: Post Roman; SF 10010. ?Same as SF 8792, 8295 and 8835 and similar to fragment from Abbey Green site, Chester Tr IV context (770) (unpublished).

Phase 14

- 29 Body fragment of cast polychrome vessel. Heavily weathered. Translucent emerald green ground with opaque yellow canes and spots. Convex curved body; WT 2.5–3 mm; B (2397): Post Roman; SF 8128.
- 30 Bowl. Fragment of overhanging rim of a cast polychrome shallow bowl or platter. Translucent emerald green ground with opaque yellow, red and ?blue canes; edge of rim chipped; WT 3 mm; B (2435): Post Roman; SF 8792. ?Same as SF 8295, SF 8835 and SF 10010.

Phase 15

- 31 Bowl. Fragment of base ring and flat base of cast polychrome bowl. Weathered but appears to be translucent green ground. Central ?green spot outlined with opaque yellow, surrounded by petals of opaque red outlined with opaque yellow; PH 9.5 mm, base th 3 mm; B (2235): Post Roman; SF 8024. Similar to SF 8366.
- 32 Bowl. Two rim fragments and part of the body of a cast polychrome shallow bowl. Wide everted rim with overhang. Heavily decayed in same way as SF 8462. Green ground but the only decoration visible because of the decay is opaque red and opaque yellow flecks; PH 20.5 mm, WT 2.5–3.5 mm, RD 190 mm; B (2430): Post Roman; SF 8280. Form similar to Cool and Price 1995 39, Fig 2.11, 212. Fig 285.
- 33 Bowl. Two fragments of everted rim and overhang from a cast polychrome shallow bowl. Heavily weathered. Translucent emerald green ground with opaque yellow canes; RD 130 mm, th 3 mm; B (2430): Post Roman; SF 8295. ?Same as SF 8792, SF 8835 and SF 10010. Fig 286.
- 34 Bowl. Body fragment of blue/green pillar-moulded bowl. Part of one rib. Iridescent and flaking. Impurity within the glass. WT 3–6 mm; B (2233): Post Roman; SF 10016. 1st–2nd century.

Phase 16

- 35 Bottle. Base and lower body of thin-walled blue/green prismatic bottle. Moulded circle in relief *c* 40 mm in diam, of which about one third survives, enclosing three moulded lines which radiate outwards, two of them in parallel, the third at right angles. They do not appear to be letters, but are probably part of a decorative 'star' (R Tomlin pers comm). Bubbly and iridescent; WT 2 mm, base th 2.5–4 mm; C (3024): Post Roman; SF 9923. 1st–late 2nd century. Fig 286.

Phase 17

- 36 Body fragment of facet-cut vessel. Oval facets in horizontal row. Colourless. Plain zone above with horizontal rib just beneath the rim; WT 2.5–3 mm; B (2221): Post Roman; SF 10012.

Phase 19

- 37 Bottle. Rim, neck and shoulder of blue/green

cylindrical bottle. Almost complete folded rim with diagonal profile. Cylindrical neck with tool marks at base. Horizontal shoulder and vertical side. Part of handle applied to the neck just below the rim. Vertical crack through rim and neck; RD 36–39 mm, WT 5 mm, PH 55 mm; B (2021): Post Roman; SF 10015. 1st–early 2nd century. Fig 286.

Phase 21

- 38 Body fragment of cast polychrome vessel. Heavily weathered. Translucent green ground. Opaque red dot outlined with opaque yellow, surrounded by petals (colour now lost) outlined with opaque yellow. Convex curved body; WT 2 mm; B (2001): Post Roman; SF 8366. Similar to SF 8024.
- 39 Jug. Extended central rib of an angular blue/green ribbon handle. Pinched into horizontal projections at intervals; W 13–16 mm; B (2001): Post Roman; SF 10067. See Price and Cottam 1998 figs 67 and 68. 1st–2nd century.

FINDS IN FUNCTIONAL CATEGORIES

By Gillian Dunn, Alison Heke, Quita Mould and Martin Henig

Introduction

The finds from the amphitheatre excavations were processed and catalogued according to the post-excavation procedures of Chester's Historic Environment Service (formerly Chester Archaeology). Throughout the project a policy of total finds retrieval and retention was adopted. All artefacts recovered from the processing of samples were recorded as such and processed in the same manner as hand-excavated material. All iron and copper-alloy artefacts were X-radiographed with selected items being X-radiographed from a number of views in order to aid identification. A full assessment was then carried out for further conservation requirements. Mechanical cleaning was kept to a minimum with some limited X-ray fluorescence (XRF) analysis being undertaken.

The assemblage was subsequently examined and recorded in detail including the material, object identification where possible, quantity, completeness, condition, dimensions, description and date. Measurements given are those of the items as excavated including their corrosion products unless stated otherwise. Full use of the X-radiographs has been made when illustrating the metalwork to avoid representation of uninformative encrustation. Some illustrations of metalwork lack a section or profile, being so heavily encrusted that these details are obscured and accurate measurement was not possible. The ironwork was studied by Quita Mould, intaglios by Martin Henig and portable ovens by Alison Heke. The other material categories were researched by Gillian Dunn.

Functional categories

Many of the artefacts are discussed in context in the main text. In this section an attempt has been made to classify the objects by function. However, there are a number of items, which because they are incomplete or lack certain features from which they can be identified, must be classed as miscellaneous. Similarly, there is a large number of unidentified fragments of ferrous and non-ferrous metal that are not included here, the details of which are held in the site archive.

There are inevitably some grey areas where the precise function of an object is not straightforward, for example the use of studs for decorating furniture or to ornament

horse trappings. Any uncertainty of this kind is indicated in the catalogue entries.

A significant proportion of the assemblage is residual or has been re-deposited, making it difficult to associate objects with specific features or activities. Some items from Post-Roman phases are included where they are considered to be of intrinsic value and hence worthy of publication.

Eleven functional categories have been identified. Coins, vessel glass and building material are discussed separately. The categories are based on those devised by Nina Crummy for finds from Colchester (Crummy 1983) and have been defined as the following:

- Military equipment
- Personal items and dress accessories
- Objects associated with written communication
- Tools
- Household equipment
- Structural ironwork
- Medical and toilet implements
- Recreation
- Weights and measures
- Buildings and services
- Structures associated with food preparation
- Miscellaneous

Ironwork

The ironwork from the Roman deposits was notably consistent, comprising chiefly of hobnails, small timber nails, small formless fragments and small pieces of slag. This assemblage, frequently recovered from sieving, may be seen as a general 'background noise' of Roman occupational debris occurring throughout the Roman deposits. Occasionally other iron objects were present amongst this material and they are discussed below. A lack of tools, domestic and structural ironwork was observable in the assemblage. As is usually the case, timber nails dominated the iron assemblage, many being represented by their broken shanks only. Only nails of 'medium size' (below 150 mm in length) were present and no large timber nails of Manning's type 1A and type 2 (Manning 1985, 134–5) were recovered.

Lead

There is a total of 880 items of lead from Roman phases (Table 67).

Those items that can be identified are listed in the catalogue for the relevant functional category. The

remainder of the assemblage, ie waste and scrap, is summarised in Table 68. Molten waste is defined as solidified droplets, dribbles and pools of spilt molten lead; scrap lead comprises sheet offcuts, trimmings and blocks of metal. The offcuts and trimmings are the discarded pieces from the cutting of sheet to shape.

Copper alloy

A total of 114 copper-alloy artefacts were recovered from Roman phases, the majority coming from Phase 5 (Amphitheatre 1a use) and Phase 6 (Amphitheatre 1b construction) (Table 69).

Military equipment

Weapons

A conical socket (Func Cat no 1) was recovered, along with an ox goad (Func Cat no 94), from a mixed deposit (1152) slumped into an underlying rubbish pit (1256) associated with the use of Amphitheatre 1a (Phase 5). While the exact dimensions are difficult to determine because of heavy encrustation, conical ferrules of comparable size were used to tip spearhead shafts and they are found alongside spearheads and other projectiles (for example the Corbridge hoard, Allason-Jones and Bishop 1988, 17 and fig 20 no 54), however, they are also common in purely civilian contexts (Manning 1985, 140–1). This example may best be considered alongside the weaponry here.

A small knobbed ferrule (Func Cat no 2) was found in a seating bank deposit (2513) for Amphitheatre 1b (Phase 6). The addition of a small knob at the tip of ferrules of this type distinguishes them from small conical ferrules and suggests they had been used as more than simple spear butts, possibly to tip wooden shafts used when drilling, practising or demonstrating fighting techniques. Elsewhere they are found along with conical ferrules in association with projectile weapons; thirteen examples were included in the Corbridge hoard (Allason-Jones and Bishop 1988, 17–22, 105), along with conical ferrules, as part of the collection of damaged military equipment buried in a wooden chest at the end of the occupation of the Phase II fort *c* AD 122–138 (Allason-Jones and Bishop 1988, 116). A group found at Ribchester (*Bremetenacum*), a fort with a known cavalry presence (*ala II Asturum*) in the late 1st and early 2nd century, were suggested to be small artillery bolt heads or a form of arrowhead (Howard-Davis with Whitworth 2000, 267). A small socket (Func Cat no 3) potentially broken from a second example, was recovered from the timber framed seating (923) in Phase 6. The socket, found directly associated with radial timber frame 11, may have been broken from a small arrowhead or artillery bolt with a very narrow neck. It is, perhaps, more likely to be broken from a projectile as it is significantly smaller than the majority of conical ferrules recovered.

A triple-ribbed arrowhead (Func Cat no 4) was found in fill (3152) of a pit cut into the arena floor associated with early post Roman occupation in Area C (Phase 10). Elsewhere in Britain these three-bladed tanged arrowheads are relatively commonly found in military contexts in the 1st and 2nd centuries (Manning 1976, 22 no 36; Bishop and Coulston 1993, 79 fig 43 5–9, 133 fig 74, 8–11). They occur at Dura-Europos associated with the mid-3rd century Sasanian Persian siege (James 2004, 194, 202–204, figs 122 and 123). A wide range of sizes were represented in the large group from Dura-Europos with those between 35–40 mm in length being most commonly recovered to which the Chester amphitheatre example can be compared. It is not certain how long this type of arrowhead continued to be used but it is thought it did not extend into the medieval period (James 2004, 195).

Table 67 Number of lead items from Roman phases

Phase	No of lead items
3	7
5	203
6	320
7	342
8	4
9	4
Total	880

Table 68 Non-catalogued lead by phase

Phase	Waste	Strip	Offcut	Sheet	Unidentified	Total
3	3	1	2	0	0	6
4	0	0	0	0	0	0
5	104	12	5	10	62	193
6	180	13	39	30	54	316
7	209	20	3	32	78	342
8	0	1	0	2	0	3
9	3	0	0	1	0	4
Total	499	47	49	75	194	864

Table 69 Number of Roman copper-alloy artefacts from each phase

Phase	No of items
3	5
5	54
6	42
7	9
8	1
9	3
Total	114

A tapering rectangular-sectioned head with a broken central shank (Func Cat no 5) may be the head broken from a *pilum* or, alternatively, the head broken from a carpenter's drill bit; these two items being difficult to distinguish (Manning 1985, 27). It was found in backfill of a truncated robber cut (2460) of the outer wall of Amphitheatre 2 (Phase 11). While much Roman material was found in this phase, the presence of more domestic material of medieval date means that the possibility of it being a discarded bit-head from a post-Roman woodworking tool cannot be dismissed.

Other weapon-related finds comprise a fragment of a sword hand grip from a Phase 7 deposit outside Amphitheatre 1a, and part of a hilt guard from the seating bank in Area B (Func Cat nos 6, 7).

Catalogue

- 1 Conical ferrule; iron. Pointed socket now fractured at the tip and heavily encrusted; L 106 mm, diam *c* 35 mm (estimated). A (1152): Phase 5 slumped mixed deposit sealing rubbish pit A (1256); SF 9650.02. (drawn from X-radiograph). Fig 287.
- 2 Knobbed ferrule; iron. Conical-headed, round-sectioned ferrule with broken socket and minerally-preserved organic from the haft within; surviving

L 32 mm, diam of socket 8 mm. B (2513): Phase 6 seating bank deposit; SF 9204.01. Fig 287.

- 3 Socket; iron. Small, tapering, round-sectioned socket, with angular section at the point of fracture; surviving L 39 mm, diam 8–10 mm (measured from X-radiograph). A (923): Phase 6 timber-framed seating; SF 8751.01. Fig 287.
- 4 Triple-ribbed arrowhead; iron. Triangular three-bladed head broken before the tang; L 38 mm, W 19 mm. C (3152) Sa <4521>: Phase 10 fill of pit cut into arena floor; SF 9294.01. Fig 287.
- 5 Pilum head?; iron. Pointed rectangular-sectioned, shouldered head and a broken rectangular-sectioned shank; L 45 mm, head W 12 × 8 mm. B (2493): Phase 11 robbing of outer wall of Amphitheatre 2; SF 8658.01. Fig 287.
- 6 Handle. Longitudinal section of a bone hand grip from a sword. Four moulded depressions of differing lengths – 24 mm, 21 mm, 19 mm and 17 mm. Groove at the 'base' of the largest depression and one at the 'top' of the smallest. Highly polished; L 83.2 mm, max extant W 13.3 mm, max extant th 7.5 mm; A (126): Phase 7 sand deposit outside Amphitheatre 1a; SF 7191. See MacGregor (1985) 165 and Fig 87; Bishop and Coulston (1993) 69–74, fig 37. First/second century. Fig 287.
- 7 Hilt guard. Part of a bone hilt guard from a sword,

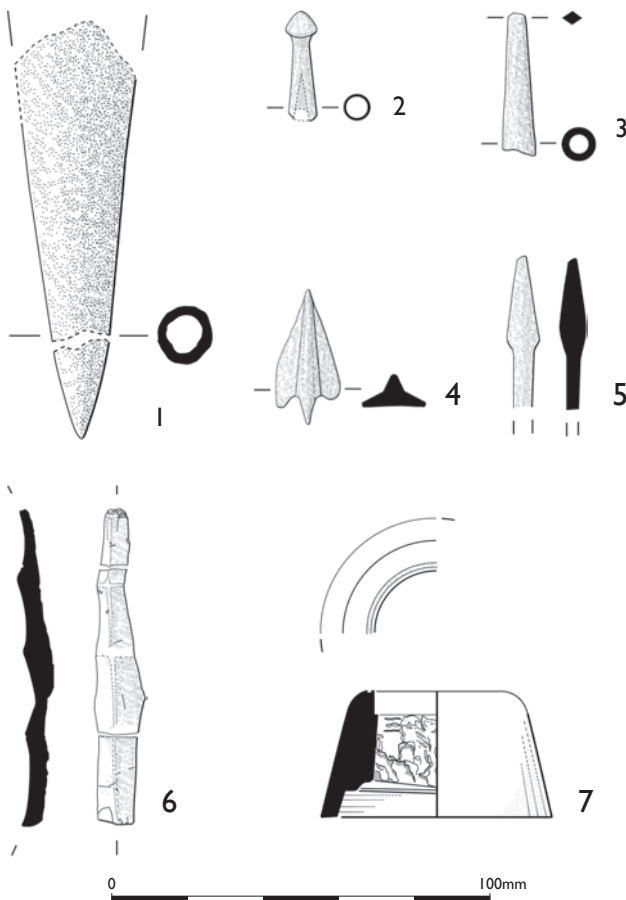


Fig 287 Military equipment: weaponry, Func Cat nos 1–7.



Fig 288 Bone gladius hilt fragment (Func Cat no 6).

finely worked and polished on external surface. Plain top with groove and squared-off base. Inner surface is roughly cut and worked; 'Seating' recess 6 mm from the top and 7 mm from the base. White and grey probably due to burning; diam of top 50 mm, 15 % extant; base diam 60 mm, 15 % extant; Ht 34 mm, max th 10 mm; B (2500): Phase 6 seating bank; SF 8811. A number of hilt guards are known in Britain and on the continent and I am grateful to Stephen Greep for drawing them to my attention. *See Greep (1991) for a summary. The best parallel for the one here is from Mainz (Mikler 1997, taf 1 nos 2, 4). Figs 287, 288.*

Armour

Small broken pieces of iron and copper-alloy body armour were recovered including pieces of plate armour and mail. The majority of these armour fragments were recovered from the seating bank deposits in Areas A (317) and B (2498, 2500, 2513, 2543, 2612) or deposits outside Amphitheatre 1 in Area A (625, 1075, 1077, 1100, 1202, 1216) dating to the last quarter of the 1st century. Due to the nature of the deposits, no items could be unequivocally associated with activities taking place within the amphitheatre. Fragments of plate armour were also recovered from deposits associated with change of use and subsequent robbing of Amphitheatre 2 (Phases 10 and 11).

Mail

The programme of soil sieving undertaken permitted individual links (rings) from mail shirts to be recovered; all were of iron, no links of copper alloy were recognised. Around 100 recognisable mail links were found, occurring principally in Area A, with very small numbers being recovered from Areas B and C, the majority coming from an occupation layer A (625) associated with the use of Amphitheatre 1a and a rubbish pit A (1256), possibly a cess pit, in Phase 5 (AD 70–80s). It would seem that the individual links had fallen from mail shirts during wear.

LINK SIZE

The individual links were not heavily encrusted (Fig 289) and complete examples measured between 7–9 mm in diameter and were *c* 1 mm thick. Two links were notably smaller measuring 5 mm and 6 mm in diameter, with one larger at 10 mm. While mail is more often found as encrusted lumps and, as James has noted (2004, 116) oxidation of the iron makes exact measurement of the individual links impossible, a rapid survey of those examples where measurement has been attempted would indicate that these mail links from the Chester amphitheatre site fall within the size range commonly recovered. Six measureable ring links present on corroded mail of late 1st-century date recovered from the sand floor on site VIB at the Deanery Field, Chester, were 7–9 mm in diameter (Newstead 1924, 78). One of these same pieces had ring diameters of 7 mm and employed alternating



Fig 289 Mail links (SF 9688) before conservation.

rows of punched rings and riveted wire links (Manning 1985, 146). Probably the best preserved mail to be recovered to date, from Dura-Europos, Syria, and of 3rd-century date, had ring diameters measuring between 6–10 mm (James 2004, 111, 116–9). The fragments of Roman mail of 3rd-century date found at the Roman-Germanic battlefield at the Hartzhorn, in Lower Saxony, Germany had individual rings measuring *c* 6 mm in diameter (www.fu.berlin.de/en/presse/informationen/fup/201 accessed 14 March 2014). It would seem that no significant distinction can be seen in the size of the individual links employed throughout the Roman period.

LINK CONSTRUCTION

By eye a small number of links appeared to be riveted (Fig 290) and a single example (SF 9690) could be seen to be closed with a butted joint (two ends butting up against each other but not overlapping). The remainder of the iron rings lacked any visible evidence of their construction nor could any be seen in X-radiograph. The recovery of individual links rather than encrusted groups of interconnecting links, gave an opportunity for their construction to be investigated further and 102 individual mail links were submitted for investigative conservation. This comprised examination under higher magnification in combination with mechanical cleaning and additional radiography with some image enhancement by Karla Graham (Historic England). While a small number were found to be heavily corroded fragments



Fig 290 Riveted mail link (SF 9306.01 link 3) after conservation.

of hobnails, the majority were confirmed to be mail links (Fig 291). Though many of the links were heavily mineralised with little metal remaining, it was possible to see features of their construction and section, and allow more accurate measurement from X-radiograph.

Mail comprises rows of joining links (rings), each link passing through four others. Roman mail may comprise alternating rows of riveted and welded links or of ‘solid’ rings (without a joint or weld) and riveted or welded links (Bishop and Coulston 1993, 190; Sim 2012, 108–9 fig 64). The process of manufacture and the tools involved have been reproduced experimentally by Sim (1997; 2012, 108–114). The Chester amphitheatre material included solid rings, that is rings with no weld or joint present, riveted links and ‘budded’ links (Fig 291) described below. While the term mail ‘link’ and ‘ring’ are generally interchangeable, for clarity here rings have no joins and links have been joined by welding or riveting.

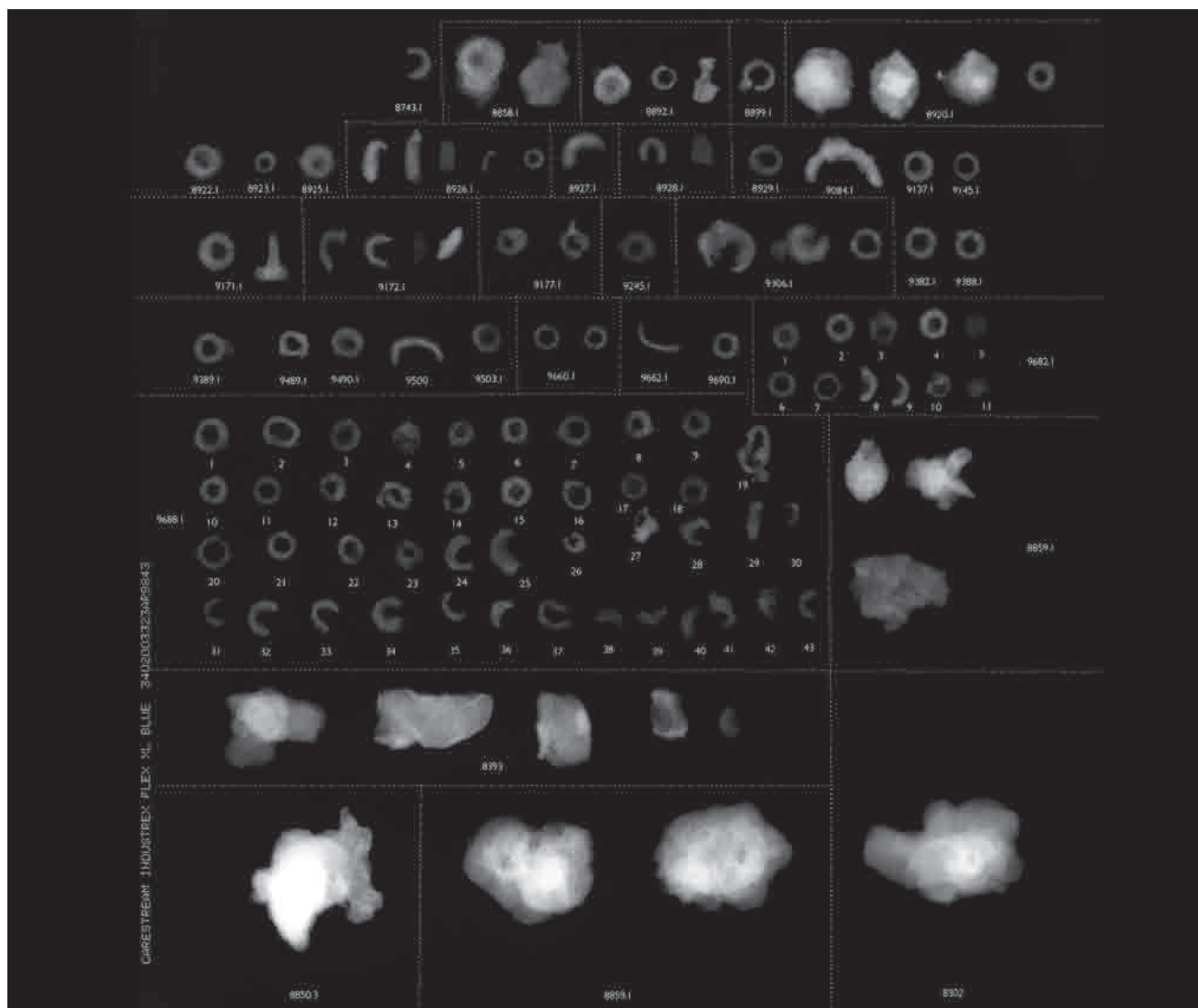


Fig 291 X-radiograph of chain mail links.

SOLID RINGS

Complete rings with no sign of joints visible in X-radiograph were present (twenty-seven examples), while some were described as ‘featureless’ (eleven) having no distinctive features indicating how they were manufactured, others (sixteen) with smooth and well defined inner and outer edges (eg SFs 9171.01, 9382.01: Fig 291) appear to have been punched (stamped) from sheet metal using two hollow circular punches of differing diameter, occasionally having sections with flattened upper and lower faces (eg SF 9503.01) supporting this assumption. When measured from X-radiograph, these complete punched rings were found to be slightly thicker than the other link types described below, averaging over 1.25 mm thick (ranging between 0.7–1.7 mm) with the complete ‘featureless’ examples averaging 1.19 mm thick. They had an external diameter ranging between 6–8.9 mm and averaging 7.15 mm.

RIVETED LINKS

A smaller number of riveted links were recognised (eg SF 9306.01 link 3: Fig 290), with nine complete and a further three incomplete examples suggested by investigative conservation, having an average thickness of just under 1 mm. Those that could be measured ranged from 4.7–7.1 mm in diameter, averaging 6.3 mm and varied in section.

WELDED LINKS

Two links were described as being ‘wrapped’ (SF 8923.01 and SF 9688.01 link 4) with the two ends of the arms of the link overlapping each other; it is likely that these links were welded with a scarf joint though in neither case could a weld line be seen in radiograph.

BUTTED LINKS

Some links were described as ‘butted’, that is the complete link had two arms that butted against each other but did not overlap; sixteen complete and three broken examples being recognised. Whilst some might simply be the result of a break in a ‘solid’ link, others (eg SF 9688.01 links 16 and 20: Fig 292a) had unbroken, well-formed ends to their arms and the butt joints appear to be original features. Butt joints have been previously noted in links of copper alloy that provided a decorative edging to iron mail shirts at Dura Europos (James 2004, 110–111 and nos. 385, 398 and 406). Butt jointed links of iron are unusual and do not appear to have been noted previously amongst Romano-British mail but this may be because detailed examination of iron mail has not been undertaken. Occasional butted links (SF 9145.01 (Fig 292b) and SF 9688.01 link 3) had a tapered end to the arms, while others had a flattened end which suggests that these examples may be failed weld joints that had pulled apart. Links described as butted had an average link diameter of 7.5 mm and were made of round sectioned wire averaging just over 1 mm thick.

The occurrence of butted links was unexpected and might suggest that some mail was not of top quality or



Fig 292 (a) Microscope image of butted mail link (SF 9688.01 link 20) after conservation. (b) Microscope image of butted mail link with flattened ends, likely to be failed weld (SF9145.01) after conservation.

had been subject to quick repair. Confirmation of complete rings with no welded, riveted or butted joints apparently punched out of sheet metal was also of interest. In general it would appear that the complete rings that are likely to have been punched from sheet metal were slightly wider than the riveted and jointed links that were made of round-sectioned wire but did not differ significantly in diameter. When measured with increased precision from

X-radiograph only three links had an external diameter less than 6 mm (the smallest 4.7 mm), the vast majority being between 6–8 mm; none exceeding 9 mm.

Plate armour (lorica segmentata)

Fragments of iron plate armour were recovered from twelve contexts. Like the mail links, the majority came from the seating bank deposits B (2498, 2500, 2513, 2543, 2612) or deposits outside Amphitheatre 1 A (625, 1075, 1077, 1100) dating to the last quarter of the 1st century. Fragments were also recovered from reworked contexts of later date, but are likely to have originated from these same deposits: two relatively large pieces of armour came from early post-Roman spread B (2457) Phase 10 and a fragment was found in a sandy deposit B (2559) in a wall robber trench B (2545) allocated to Phase 11 but apparently deriving from adjacent *in situ* Roman seating bank material that had collapsed into the trench in antiquity. The context of recovery of a single fragment (Func Cat no 14) coming from a later deposit is of potential interest having been found in a layer (3096) of early Post-Roman spread (10e) in Area C but thought to largely derive from sands from the arena in Amphitheatre 2 and so conceivably dating to AD 350s.

IDENTIFICATION OF PLATE ARMOUR

The fragments initially identified were all distinguished by their flat section and the nature of the surface corrosion (see for example Fig 294, Func Cat no 9). In general, all the plate armour was less encrusted than other iron items from the same contexts and often covered in apparently random minerally-preserved organic remains; some had a distinctly curved profile, some had lengths of outward curving edge, and some had parts of copper alloy fittings surviving. Thickness is difficult to measure when iron is heavily mineralised and the surfaces covered in corrosion products and minerally preserved organic remains. By eye, sections revealed by breaks suggested the plate to be about 1–2 mm thick. When measured from radiograph during detailed examination (see below) some very thin examples below 0.5 mm in thickness were recorded (eg SF 9390.01) but this was the exception.

In the past, similar fragmentary plate armour from other excavations has been subject to investigative conservation by mechanical cleaning but no obvious surface treatment has been detected that might account for the lesser degree of encrustation observed. Thom Richardson (Curator Emeritus, Royal Armouries) has observed that a hardened oxide coating formed during manufacture is present on plate armour of medieval date (pers comm) and it is likely that this is the case here. The potential plate armour fragments were investigated by Karla Graham to aid their identification and see whether any signs of surface treatment remained or whether a hardened oxide layer could be detected: the latter will be discussed further below.

ARMOUR COMPONENTS RECOGNISED

All the iron fragments recovered come from articulated plate armour, *lorica segmentata*. Only one scale (of copper alloy) from *lorica squamata* was found (Func Cat no 16). Although some pieces (eg Func Cat no 9) superficially resembled pieces of scale, close examination revealed that all had been broken from larger pieces; none were of the dimensions nor had small paired holes for wire fastenings that would indicate broken scale armour. Six fragments of iron armour had remains of copper-alloy fittings present (Func Cat nos 9, 10, 12, 13 and 15). Nineteen fragments had one or more areas of original edge remaining. At least three pieces (Func Cat nos 8, 10, SF 8813 piece 4) were found to comprise two individual layers of plate lying one above the other, a fourth (SF 8813 piece 2) comprised four separate layers; the result of the armour being over-compressed while still articulated. Two fragments (SF 9325.02 and SF 9425) showed damage possibly resulting from a blow. These features were used to identify the range of armour components present.

ARM DEFENCES

Seventeen fragments had areas of original edge surviving. Seven had their two opposite sides present so allowing the width to be measured, five also had an original straight end (eg Func Cat no 11), two with cropped corners (Func Cat nos 8 and 9). They were rectangular in shape ranging in width between 18.5–28.6 mm (measured from radiograph). Their shape and dimensions, and the occasional presence of rivets/rivet holes suggest that these fragments of armour are broken lames from arm defences (arm-guard *manica*) though, it must be said that, the measurable examples (seven) appear rather narrow in comparison with those on the three near complete arm defences found together in an occupation layer within a building dating to *c* AD125 – *c* 140s at Carlisle (arm-guard A 31–136 mm; arm-guard B 28–33 mm, arm-guard C 28–34 mm Bishop 2009, 692–700).

Amongst the twenty groups of armour fragments examined a small number of fragments had square nail/rivet holes and thicker section, and consequently, were identified as pieces of nailed binding rather than armour and are not included in the discussion above. It should be borne in mind, however, that square, rather than round, holes may not preclude them from coming from plate armour as iron rivets were also employed on occasion. One of the arm-guards found during the Carlisle millennium excavations (Bishop 2009, 696–7) had a combination of copper-alloy and iron rivets (arm-guard B), another used all iron rivets (arm-guard C).

BODY DEFENCES

Two fragments of plate (Func Cat nos 12, 13) *c* 1 mm thick, each with an outward curving edge and remains of copper-alloy fittings were found in early post-Roman

spread B (2457) in Phase 10. The gently lobed end of a small copper-alloy hinge fitting and a separate rivet survive on one, with a group of four rivets and the rounded end broken from a copper-alloy fitting on the other. The outward curving edges from a neck opening indicate the fragments to be broken from a breastplate, collar plate or back plate. Orientating the pieces from the position of the neck edge and copper-alloy fittings suggests they both come from the right side of body armours. The rolled edge at the neck opening and remains of the small lobate hinge on one piece (SF 8793) suggests it belongs to a Corbridge type armour dated from the mid-1st to the mid-2nd century (Bishop 2009, 692). A very limited area of rolled edge had also survived on two much smaller armour fragments (SF 9220.01 piece 1, SF 9390.1 piece 2) from late 1st-century contexts B (2612) and A (1100) respectively. In contrast, the turned out edge at the neck opening of the second fragment (SF 8793) suggests it may come from a Newstead type armour (Bishop 2002, 49) dating to the mid-2nd to late 3rd century (Bishop 2009, 692) though both fragments were found together in the same deposit.

SURFACE TREATMENT

On cleaning, a silver-grey surface was visible on three examples (SFs 8668, 8705, 8757.02) while a black surface was noted on twelve fragments from eight groups of broken armour (SFs 9191.01, 9204.05, 9214.02, 9216.01, 9220.01, 9325.02, 9401.04 and 9425.01). These features, suggestive of surface treatments, could not be verified, however. XRF analysis was not able to detect any 'white metal' potentially deriving from a silver or tin surface coating nor could any consistent differences be found in the concentration of iron or any other element despite differing coloured surfaces being visible on each side of a number of armour fragments. This was considered to be due, in part, to the limitations

of non-destructive XRF being carried out on irregular and partially corroded surfaces (pers comm David Dungworth). Surface treatments have been found on plate armour from elsewhere and it may be that other methods, such as XRD, may be more successful in the future. Part of an upper shoulder guard from Xanten had been tinned (Bishop 2002, 80) and evidence that some ferrous plate armour had been painted black was found amongst the fragments of body armour of uncertain type recovered during the Carlisle millennium excavations (Bishop 2009, 694 Appendix 4 Iron 2757; Howard-Davis 2009, 497 pl 166).

Plate armour catalogue

- 8 Plate armour lame: iron. Rectangular plate with parallel sides and a straight end, one with a cropped corner and large rivet hole at the other. Remains of a second plate adhering. L 46.3 mm, W 24 mm, th 3.4 mm (measured from radiograph). A (1077): Phase 5 top fill of cut A (1078) outside Amphitheatre 1; SF 8757.02. Fig 293.
- 9 Plate armour lame: iron and copper alloy. Straight sides and end with cropped corners, other end broken as though snapped off. Remains of copper-alloy rivet present in one cropped corner. L 28.3 mm, W 28.6 mm (measured from radiograph). B (2498): Phase 6 seating bank deposit; SF 8810.02 (found with armour buckle Cat no 18 below). Figs 293, 294.
- 10 Plate armour fragment: iron and copper alloy. Rectangular fragment with copper-alloy rivet, curved profile, second layer lying obliquely across the other visible in radiograph. L 27 mm, W 15.9 mm, th 4.3 mm (measured from radiograph). B (2513): Phase 6 seating bank deposit; SF 9191.01. Fig 293.

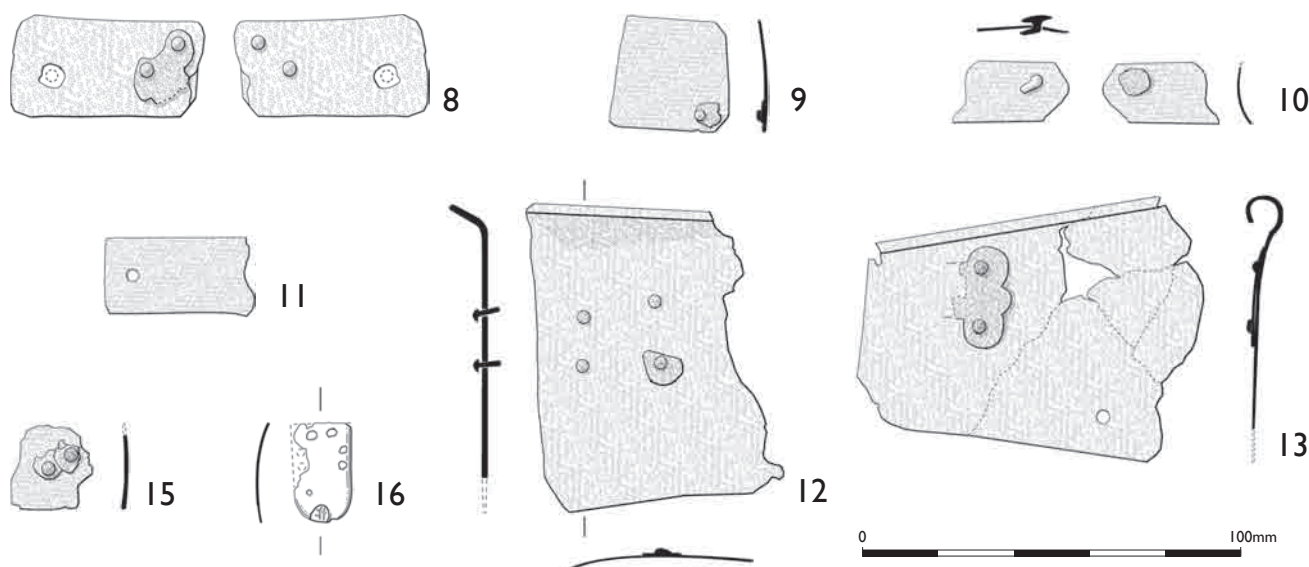


Fig 293 Military equipment: plate armour, Func Cat nos in range 8–16.



Fig 294 Plate armour fragment, Func Cat no 9, before conservation.

- 11 Plate armour lame: iron. Rectangular fragment with two parallel sides and straight end, other end broken. Curved profile, rivet hole visible in radiograph. L 37 mm, W 21 mm. B (2513): Phase 6 seating bank deposit; SF 9197.01. Fig 293.
- 12 Plate armour: iron and copper alloy. Rectangular fragment of plate with an out turned original edge, the opposite edge is straight and regular for a small section possibly original, both ends are broken. An arrangement of four copper-alloy rivets present some 22–25 mm below the out-turned edge, with one securing a gently lobed fragment of a copper-alloy fitting. The plate has a gently curved profile, the rivets are covered by thick minerally-preserved organic remains on the outer (convex) face with a small amount around the rivets on the inner. Surviving L 78.6 mm, W 57.1 mm (measured from radiograph). B (2457): Phase 10 early Post-Roman spread; SF 8793. Fig 293.
- 13 Plate armour: iron and copper alloy. Sub-rectangular slightly tapering fragment of plate with outward rolled original edge, opposite edge straight and diverging from the other, fractured into five pieces, both ends broken. The lobed end of a small copper-alloy hinge plate (27 mm wide) present aligned at a near right angle and close (*c* 8 mm) to the outward rolled edge, with a single rivet present 8 mm from the opposite edge. Approx. surviving L 90 mm, W 65 mm (measured from radiograph). B (2457): Phase 10 early Post-Roman spread; SF 8793. Fig 293.
- 14 Plate armour lame: iron. Rectangular plate fragment with two parallel sides and a straight end, other end broken. A small area of edge curves outward. A second plate lying across the first visible in radiograph. L 41 mm, W 21.3 mm (measured from radiograph). C (3096): Phase 10 early Post-Roman spread; SF 9425.01.
- 15 Plate armour: iron and copper alloy. Small area of original edge and two copper-alloy rivets passing through overlapping washers. Silvery-grey surface visible. Surviving L 20.1 mm, W 22.1 mm, max th 6.5 mm (measured from radiograph). B (2559): Phase 11 wall robber trench; SF 8705.01. Fig 293.
- 16 Scale armour. Copper alloy. One scale of *lorica squamata*, slightly domed. Damaged on one side resulting in the removal of one set of holes but enough to determine that it is of Von Groller's type V (see Bishop and Coulston 1993 fig 51); L 26 mm, W 15 mm. B (2354): Post Roman; SF 8093. Cf Bishop (1998 fig 22, nos 226, 227); Crummy (1983 fig 161, no 4246). Fig 293.

Armour fittings

Two complete iron buckles with D-shaped frames with separate, straight pin bars (Func Cat nos 18, 23) were found. They are characteristic of military buckles more commonly seen in copper alloy and comparable with examples from *lorica segmentata* of mid-1st century date from Hod Hill (Manning 1985, 146–7, T4, T5). The larger (Func Cat no 18) was found with a piece of plate armour (Func Cat no 9) in seating bank deposit B (2498) of Amphitheatre 1b (Phase 6), the other (Func Cat no 23) occurring residually in fill B (2251) of a shallow pit of Post-Roman date also in Area B. A fragment broken from the frame of a third buckle came from an occupation layer A (625) in Phase 5 (Func Cat no 17). While the D-shape of the slender frame suggests a buckle, such a small size is unusual in iron though examples of copper alloy are commonly of this size (for example Bishop 2002, 25 fig 4.2 nos 6 and 7). A fine stem, possibly a broken buckle pin (Func Cat no 19), was found in the Amphitheatre 1b seating bank B (2500) in Phase 6.

The copper-alloy armour fittings were all either from Phase 11b backfill of robber trenches or Post-Roman contexts – the one exception being a possible *lorica segmentata* fitting from Phase 8, the fill of a construction cut (Func Cat no 25). The three 1st- and 2nd-century copper-alloy buckles with D-shaped frames were recovered from the backfill of a robber trench in Phase 11b and a Post-Roman context. A fragment of a possible bone buckle was also from Phase 11b.

Catalogue

- 17 Buckle; iron. D-shaped frame fragment of round-sectioned wire. Surviving width 14 mm, wire diam 1.4 mm (measured from X-radiograph). A (625) Sa <4709>: Phase 5 occupation layer; SF 9500.01.

- 18 Buckle; iron. D-shaped frame with separate straight pin bar and pin. Non-ferrous metal plating visible in radiograph. Ht 37 mm, W 35 mm. B (2498): Phase 6 seating bank deposit; SF 8810.01. Fig 295.
- 19 Buckle pin?; iron. Fine round-sectioned straight stem curved in opposite planes at each end. L 28 mm, W 4 mm. B (2500): Phase 6 seating bank deposit; SF 8812.03.
- 20 Buckle. Copper-alloy. Part of D-shaped buckle loop with perforated flattened oval terminal. Loop sub-rectangular in section. Probably same as SF 8485; L (complete) *c* 30mm, W *c* 33mm; loop section 5 mm × 2 mm. B (2532): Phase 11b backfill of robber trench; SF 8474. *Cf* examples from Castleford (Bishop 1998, fig 27, nos 326–328); Colchester (Crummy 1983, fig 55, no 1815); London (Bateman *et al* 2008, fig 61, sf 47); and Exeter (Allason-Jones 1991, fig 100, no 38). Similar example from Catterick, with a circular section shaft is suggested as being a ‘bar-and-loop’ handle from a toilet set (Lentowicz 2002, fig 248, no 120), see also Crummy (1983, fig 67, no 1943). 1st–2nd century.
- 21 Buckle. Copper-alloy. Part of D-shaped buckle loop with perforated flattened oval terminal. Loop sub-rectangular in section. Probably same as SF 8474; L (complete) *c* 30mm, W *c* 33mm; loop section 5 mm × 2mm. B (2532): Phase 11b backfill of robber trench; SF 8485. *Cf* examples from Castleford (Bishop 1998, fig 27, nos 326–328); Colchester (Crummy 1983, fig 55, no 1815); London (Bateman *et al* 2008, fig 61, sf 47; Exeter (Allason-Jones 1991, fig 100, no 38). Similar example from Catterick, with a circular section shaft is suggested as being a ‘bar-and-loop’ handle from a toilet set (Lentowicz 2002, fig 248, no 120), see also Crummy (1983, fig 67, no 1943). 1st–2nd century.
- 22 ?Buckle. Incomplete transverse section of a long bone with knife marks on both faces. Probably part of a buckle; diam *c* 39 mm, W 7 mm, Th 5–6 mm; B (2518): Phase 11b residual in backfill of robber trench; SF 8536. A similar, smaller example was recovered from excavations at the amphitheatre in 2001, Trench XII, (149) SF 83 and a more ornate example from Chester’s Hunter Street School site 1981 (1048) SF 932. *See also* MacGregor (1985, 103, fig 60).
- 23 Buckle; iron. D-shaped frame with separate straight pin bar and pin with hooked terminal articulating with the frame. Ht 30 mm, W 28 mm. B (2251): Post-Roman; SF 7577.01. Fig 295.
- 24 Buckle. Copper alloy. D-shaped openwork loop with splayed attachment. Semi-hexagonal section; terminals broken; tongue missing but iron deposit around the bar; L 29 mm, W 24 mm. C (3081): Post Roman; SF 8457. Similar examples found at Crook Street and Abbey Green, Chester and also at Tiverton, Cheshire in 2003 (Herepath and Carrington 2005, 14); *cf* Allason-Jones and Milet (1984, nos 3.622 and 3.627); Bishop and Coulston (1993 fig 112, no 7); Oldenstein (1976, taf 75, 76). AD 150–200. Fig 295.
- 25 ?Armour fitting. Roughly rectangular piece of copper alloy with central ?rivet. Possibly fitting from *lorica segmentata*; L 23mm, W 15 mm, Th *c* 1 mm (all measurements taken from x-radiographs). A (678) Sa <4154>: Phase 8 fill of construction cut; SF 8880.
- 26 ?Strap end or ?harness decoration. Copper alloy. Heavily corroded; teardrop shape with chain loop and ?hinge; two protruding rivets on each side, at the widest dimension, 15 mm from the top of the chain loop; L (max) 35 mm, W (max) 22 mm (measurements taken from X-radiograph). B (2532): Ph 11b backfill of robber trench; SF 8455.
- 27 ?Strap fitting. Rectangular strip of copper alloy with one rivet; present L 15 mm, Th *c* 1 mm. B (2493): Phase 11b fill of robber trench; SF 8461.
- 28 Strap fitting. Copper alloy. Hinged fitting from *lorica segmentata*. Half of fitting but hinge pin is still in place with part of the hinge from the adjoining plate. Two rivets and fragment of mineral preserved leather strap *in situ*; leather 0.08 mm thick, 0.9 mm at thickest point; L 22 mm, W 14mm. B (2541): Phase 11b fill of robber trench; SF 8468. *Cf* Crummy (1983, fig 145, no 4186); Bishop and Coulston (1993, fig 52, nos 25–8); Bishop (1998, fig 21, nos 219–22; 1987, fig 8); Robinson (1975, fig 187). Mid–late 1st century. Fig 295.
- 29 Armour fitting. *Lorica segmentata* fitting; roughly triangular piece of copper alloy with hinge bar and two rivets. Possible rectangular plate but damage and corrosion at the end. May have been attached to a strap or buckle; L 26 mm, W (at hinge bar) 13 mm. B (2353): Post Roman; SF 8086. *Cf* Crummy (1983, fig 145, no 4186, fig 152 nos 4221, 4222); Bishop (1998, fig 21, nos 219, 220); Bishop and Coulston (1993 fig 52). Fig 295.
- 30 Strap fitting. Copper alloy. Roughly triangular-shaped fitting from ?*lorica segmentata*. Hinge pin missing. One rivet *in situ*; incised line slightly in from the edge of the exterior face; present L 16 mm, W 5–14 mm, Th *c* 1 mm. B (2449): Post Roman; SF 8675. Fig 295.
- 31 Armour fitting. Copper alloy. Two hinge fittings from *lorica segmentata*. One almost complete with rivet hole and ?rivet *in situ*; XRF analysis shows areas of high tin therefore potential tinning; L 18 mm, W 13 mm; one fragment of hinge only. A (376): Post Roman; SF 9185.

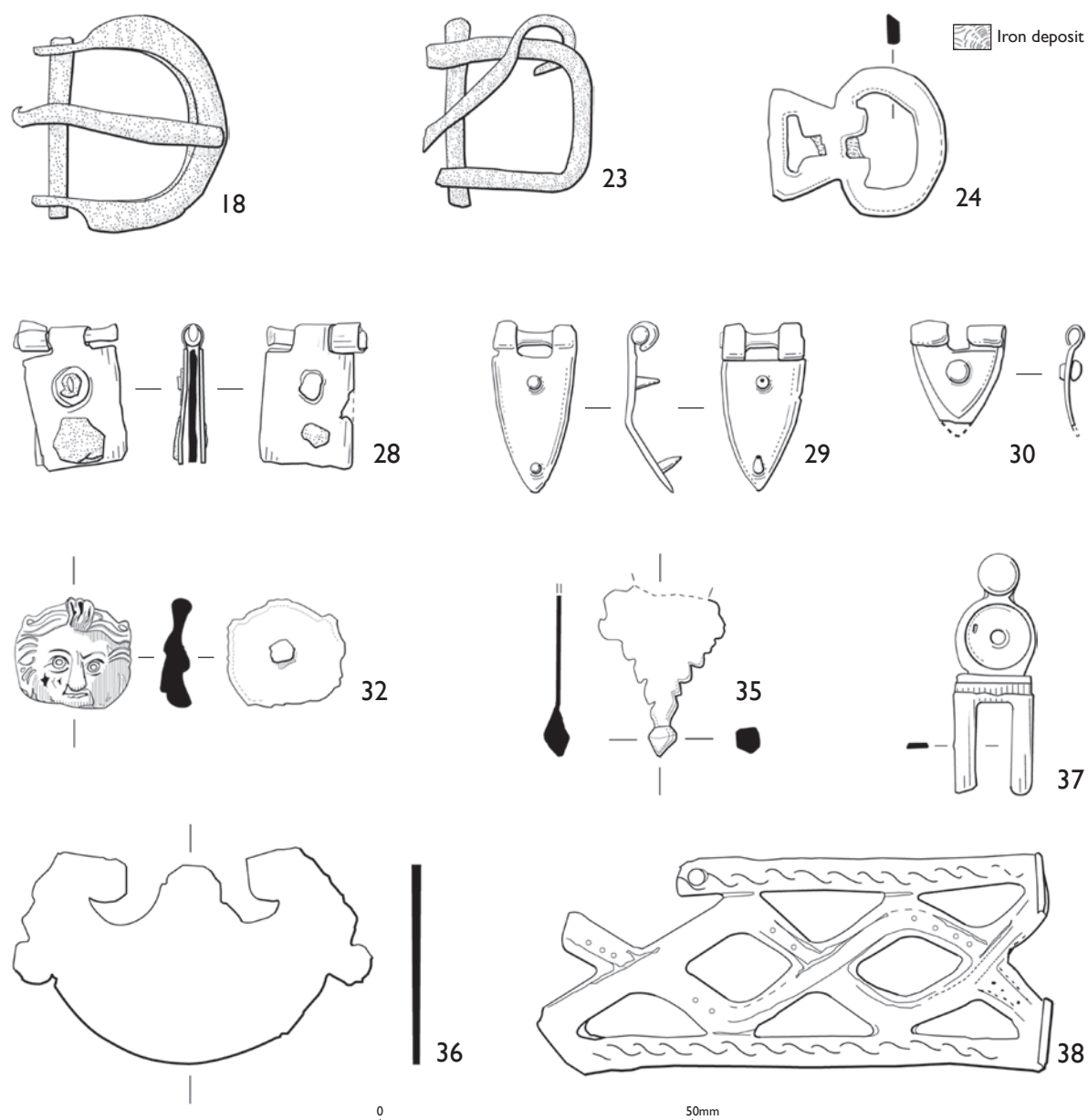


Fig 295 Military equipment: armour fittings, Func Cat nos in range 18–38.

32 Stud. Small copper-alloy stud depicting a 'human' face with wavy hair fanning out around the face and a top knot. Hollow pupils with lids above and folds below. Shallow chin. Hollow on reverse side; shaft broken; XRF on front and rear gave high lead result; similar examples have been found on pendants but may also be vessel mounts; ht 17 mm, W c 18 mm. A (1216) Sa <4784>: Phase 5 fill of pit A (1256); SF 9642. There are similar examples from Carlisle (Howard-Davis 2009, fig 399 no 7), Ribchester (Howard-Davis 2000, fig 61 nos 93, 94) and from the Walbrook (Wilmott 1991, 128, fig 90). Figs 295, 296.

33 Stud. Three fragments of a copper-alloy rosette



Fig 296 Copper alloy stud, Func Cat no 32.

stud, possibly from a military apron. Most of the shaft has broken off; too fragmentary to determine diam. A (516): Phase 6 fill of outer ring beam-slot/radial beam-slot; SF 8637. Cf Crummy (1983, fig 144 nos 4174, 4175; fig 151); Oldenstein (1976, taf 57, no 707).

- 34 ?Pendant. Copper alloy. Two joining pieces of 'plate' to give a lozenge-shaped ?pendant. Apex is folded over into a loop; L 40 mm (complete L c 45 mm), W 28 mm. B (2543) Sa <4333> Phase 6 seating bank material; SF 9383.

- 35 Pendant. Copper alloy. Approximately half of a teardrop pendant with terminal knob. Edges damaged but irregularly knotted. Possible apron terminal or part of cavalry harness; L (extant) 26 mm, W (max) 20 mm, Th 0.5 mm. C (3060): Post Roman; SF 8270. Cf Bishop (1988, fig 45; 1998, fig 25 no 295). Fig 295.

- 36 ?Mount/?fitting. Copper alloy. Pelta-shaped with two lugs. Appears to be complete but part of the central stem may be missing. Mineral preserved organic matter adhering to both sides; L (max) 58 mm, W 35 mm, Th c 1.5 mm. B (2513): Phase 6 seating bank deposit; SF 8799. Cf Oldenstein (1976, taf 53). Fig 295.

- 37 Mount. Part of a copper-alloy openwork mount or fitting. Circular terminal with central hole, moulding beneath two 'prongs' forming a rectangle. Circular terminal is recessed suggesting it was originally inlaid with enamel but XRF analysis did not detect any inlays. Flat on reverse suggesting it was attached to belt; present L 38 mm, W 12 mm, Th up to 1 mm. B (2561): Phase 11b fill of robber trench; SF 8539. Cf Oldenstein (1976, taf 68, no 888). Fig 295.

- 38 Mount. Rectangular copper-alloy openwork mount. Triangular- and diamond-shaped cut-outs. One rivet hole. Two terminals at one end bent over to form a right angle. Incised wavy line and parallel decoration on one face; XRF analysis confirmed gilding of gold and mercury. This is very similar to another piece from the amphitheatre, published by Thompson (1976, fig 26, no 21). Compare also an example from Corbridge (Allason-Jones 1988, fig 86 no 174). However, the decoration and gilding on the recent find suggests that it may be of post-Roman date (see Volume 2); L 82 mm, W (max) 34 mm, Th 1 mm. C (3080): Post Roman; SF 8347. Fig 295.

Label or tag

A lead label or tag, folded, pierced and inscribed was recovered from the fill of a robber trench in Phase 11a. It is sometimes the case with these items that they are inscribed with a personal name on one side, indicating ownership in this instance by a member of the century).

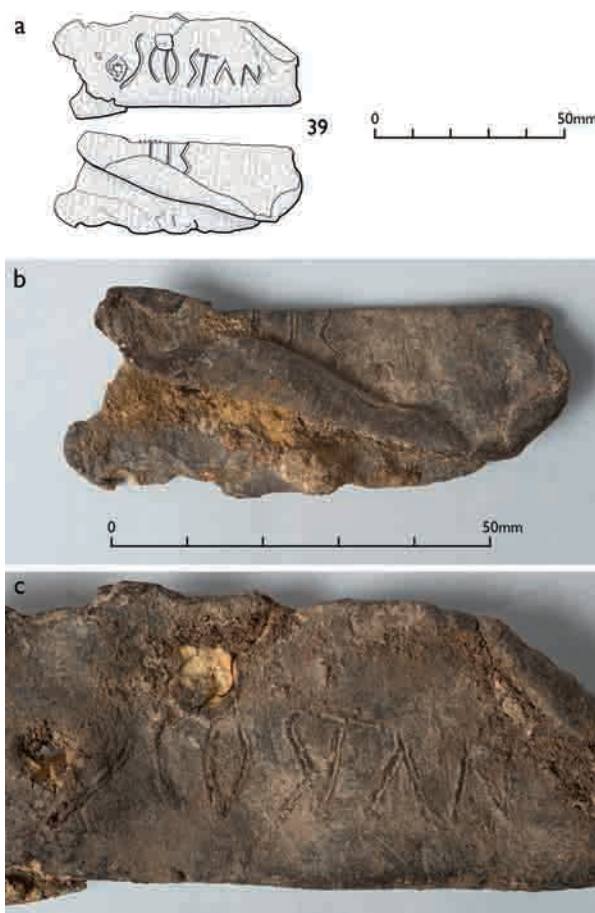


Fig 297 Lead tag with centurial inscription, Func cat no 39.

Unfortunately, due to the condition of this piece, it was not possible to unfold it.

- 39 Label or tag. Folded, pierced piece of lead with a hole and inscribed
>COSTAN TIS: (*centuria*) *Co(n)stan | tis* – 'Century of Constans' (pers comm R Tomlin). This would have been attached to something belonging to a century. The assimilation of [ns] to [s] is quite common; L 66 mm, W 26 mm (max) (folded). A (308): Phase 11a fill of robber trench; SF 10110. Fig 297.

Personal items and dress accessories

Brooches

In total there are nine brooches – eight bow and one disc brooch, including Chester types (Func Cat nos 40, 41), Polden Hill and Colchester derivative types (Func Cat nos 44, 45). Two of the brooches are iron, the rest being copper alloy. In addition there are associated fragments of pins, springs and chains.

Parts broken from two bow brooches of iron were recovered occurring residually in contexts in Phase 6 (c AD

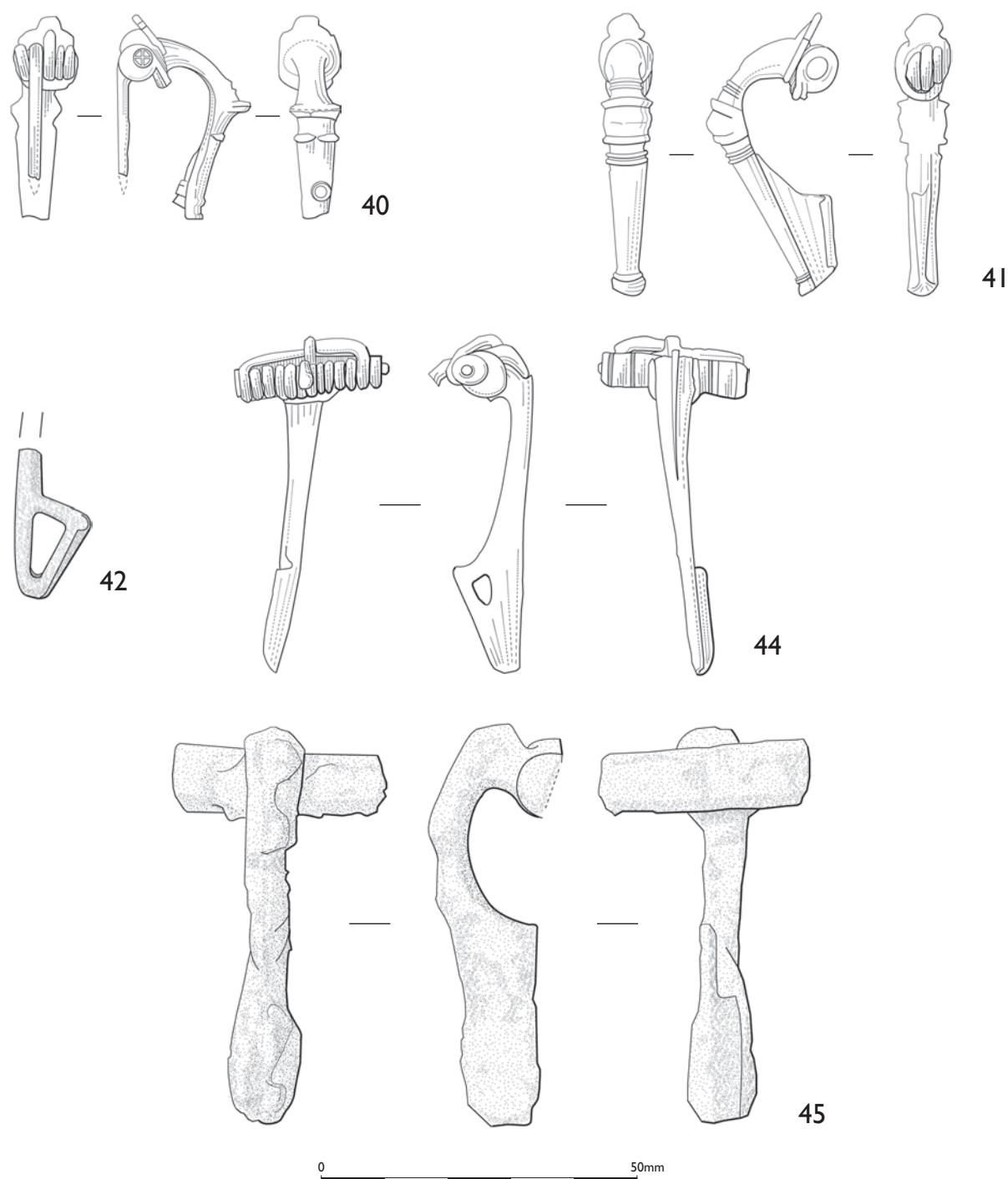


Fig 298 Personal items and dress accessories: brooches, Func Cat nos in range 40–45.

100). A broken brooch spring (Func Cat no 43) came from the main fill (1127) packing radial timber frame 15 of the timber-framed seating structure in Area A and a triangular catchplate (SF 9364.03) from a second example came from a seating bank deposit (2543) for Amphitheatre 1b thought to be rubbish from the legionary fortress or outlying *canabae* and deposited *c* AD 90–120 (Cat no 42). While these brooch parts cannot be closely dated they are unlikely to date much after the third quarter of the 1st century

(Hilary Cool pers comm). The catchplate is pierced by a large triangular hole now completely obscured by corrosion products, the end of the catchplate is rolled to hold the end of the pin.

- 40 Brooch. Copper alloy. Four-turn spring, part of bow and part of the pin of a trumpet brooch. Foot knob and catch plate missing. Head has a flat circular plate with blind 'chain loop'. Simple

moulding on bow – knurled with rib above and below. Moulding doesn't continue on reverse of bow but possible that there is further decoration on the lower half of the bow. Bow thicker at start of catch plate. Too corroded to determine number of turns on spring; present L 33 mm. A (625) Sa <4715>: Phase 5 occupation layer; SF 8540. Chester type (Hull type 154); Cf Hattatt (1985, fig 45 no 438). 1st–2nd century. Fig 298.

- 41 Brooch. Copper alloy. Spring and part of bow of a trumpet brooch; pin missing. Head has a small flat circular plate with blind 'chain loop'. Moulding high up on the bow with two ribs above and below. Moulding doesn't continue on reverse of bow; joins with the foot knob and catch plate from SF 9246; present L 45 mm. B (2498) Sa <4380>: Phase 6 seating bank; SF 8838. Chester type cf Hattatt (1985 fig 45 no 438). 1st–2nd century. Fig 298.

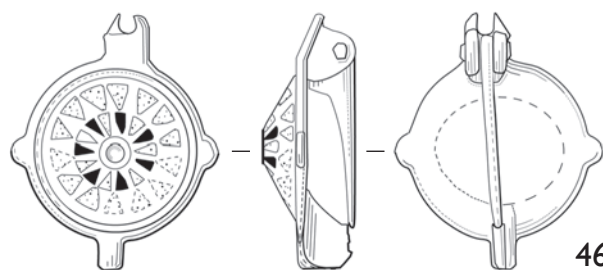
- 42 Brooch foot; iron. Open triangular catchplate and part of the narrow, tapering lower bow likely to be of round section. L 27 mm, W 19 mm. B (2543) Sa <4317>: Phase 6 seating bank of amphitheatre 1b; SF 9364.03. Fig 298.

- 43 Brooch spring; iron. Distorted coils of a broken spring of round-sectioned wire. Copper also detected by XRF analysis. L 16 mm. A (1127) Sa <4746>: Phase 6 fill of radial timber frame slot; SF 9717.01.

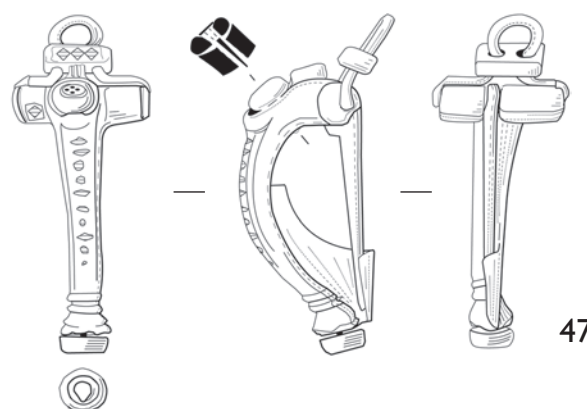
- 44 Brooch. Copper alloy. Polden Hill type, complete except for pin. Bow appears to be circular/ovoid in section and tapers almost to a point so that the catch plate is of bow thickness; top of bow is decorated with a rib; triangular catch plate with triangular perforation; ten-coiled spring; chord passes through a perforated lug; wings have vertical grooves; L 53mm. B (2472): Phase 11b fill of robber trench; SF 8383. Similar example from Gorse Stacks, Chester (Cool 2012a, 95, fig 2.28 no 2). Second half of 1st century. Fig 298.

- 45 Brooch. Copper alloy. Bow and spring of Colchester Derivative brooch; pin is missing. Very corroded; moulded foot knob; L 62mm, W at wings 34 mm (measurements taken from an x-radiograph). A (337): Post Roman; SF 7335. Mid–late 1st century. Fig 298.

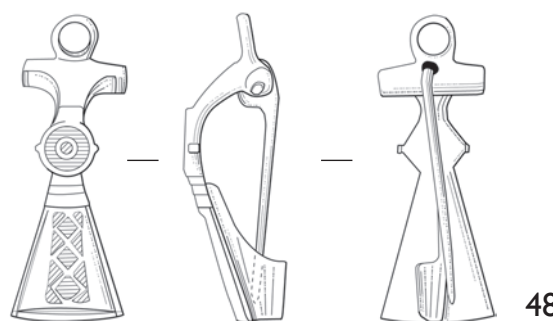
- 46 Brooch. Copper/tin-alloy disc brooch with domed centre, enamelled; two registers of geometric sunburst pattern of triangular cells. Two colour pigments dark (black) and light. Groove running just inside the perimeter; small depression in the centre surrounded by a groove. Chain loop with three additional lugs. Hinged pin; tip of pin and catch plate broken; diam 23mm, 28mm including lugs. B (2094): Post Roman; SF 7393. Cf Hattatt (1982 140–1, fig 59, no 128; 1985 142–3, fig



Light enamel
Dark enamel



Blue enamel



?Red enamel
Blue enamel

0 50mm

Fig 299 Personal items and dress accessories: brooches, Func Cat nos 46–48.

61, no 536), Bayley and Butcher (2004, fig 99). Flavian–mid second century. Figs 299, 300.

- 47 Brooch. Copper alloy. Complete headstud brooch. Deep catch plate; short wings. Hinged pin with axis bar in a tubular casting behind the wings; pin slightly off-centre in the axis bar. Chain loop



Fig 300 Enamelled brooches, Func cat nos 46–48.

clamped at neck with a band. Rib mouldings above foot knob which is attached with slightly bent pin. Thirteen blue (cobalt) enamelled lozenges. Arrangement of four small spots on the stud. Faint traces of lozenge decoration on the wings and on the clip of the headloop. XRF analysis suggests copper/zinc/lead/tin alloy. L 46 mm. B (2332): Post Roman; SF 7932. Cf Bayley and Butcher (2004, fig 76). Figs 299, 300.

- 48 Brooch. Alloy of copper, tin and lead. Complete bow-and-fantail type. Plain bow with roundel between bow and tail. Roundel has been grooved for enamel, now lost; three grooves beneath roundel; groove around the edge of flat triangular leg which is decorated with three enamelled lozenges. One dark pigment (red or black) and one light pigment; same light enamel as the one placed in the main decoration is placed in the furrow surrounding the round dark enamel inlay. Integral chain loop; L 41mm. C (3080): Post Roman; SF 8346. AD 50–150. Figs 299, 300.

Finger rings

Three iron finger-rings have been recovered: one (Func Cat no 49) was found in an occupation layer A (625) associated with the use of the Amphitheatre 1a dated to c AD 70–80s, another (Func Cat no 50) in a seating bank deposit (2612) of Amphitheatre 1b dated to c AD 100, the third (Func Cat no 51) in a Post-Roman layer C (3068). Ring (Func Cat no 51) has an oval setting for a stone, now missing, no trace of the original gem, adhesive material

to hold one in place, or enamel was detectable. Similarly, what appears to be an empty oval setting can be seen in X-radiograph on the others (Func Cat nos 49, 50), certainly no intaglios or engraved decoration are visible. The empty settings suggest they are likely to have been signet rings; as Croom says ‘part decorative, part amulet and part personal seal’ (2002, 73). One of the finger-rings (Func Cat no 50) has a possible non-ferrous metal coating noted during conservation. The fine details of each are now obscured by corrosion products but they each appear to have hoops of round or oval section falling within Henig’s Type II (Henig 1974, 47 and fig 1) which he suggested were characteristic of the second half of the 1st century and the early years of the second, or Guiraud’s Type 2c and 2d (Guiraud 1989, 181 fig 11) which she dates from the 1st century to third quarter of the 2nd century, and mid first through to the 3rd century respectively. The two (Func Cat no 49, 50) from well-dated contexts at the amphitheatre provide valuable dating evidence for this type of jewellery.

The choice of iron for the hoop, rather than gold or copper alloy, appears to have been based on considerations other than cost. Iron rings were often set with very fine gems so the base metal setting did not reflect their cost (Henig 1974, 22). The tradition for the Roman aristocracy to wear iron rings seems to have survived to the 3rd century, though it appears to have fallen from popularity at the end of the 2nd century (Manning 1985, 78 quoting both Henig and Cool). Even when taking into account the iron encrustation present these rings have notably small internal diameters of 14–20 mm which might suggest they had not been worn on large male hands unless worn on the finger above the finger-joint. The wearing of finger-rings on each finger-joint in Britain and Gaul is mentioned by Pliny the Elder (*Hist Nat* 33.6.24–5) and painted linen shrouds from Egypt show rings being worn on the upper finger-joints of both men and women (Croom 2002, 73 fig 28.4, 28.5 and 116–7 fig 56). Pliny the elder tells of plain finger-rings of iron being sent to women as betrothal rings (*Hist Nat* 33.4.12 quoted in Croom 2002, 117).

- 49 Finger-ring; iron. Plain, broken hoop of oval section expanding slightly to an oval bezel. L 32 mm, W 16 mm (internal diam 19 mm). A (625): Phase 5 occupation layer; SF 8541.01. Fig 301.
- 50 Finger-ring; iron. Plain hoop expanding slightly to a small oval bezel. Possibly coated with non-ferrous metal. D 21 mm, L 21 mm, W 11 mm, W of bezel 6.5 mm (from radiograph) (internal diam 14 mm, 16 mm in X-radiograph). B (2612) Sa <4373>: Phase 6 seating bank deposit of amphitheatre 1b; SF 9325.01. Fig 301.
- 51 Finger-ring; iron. Plain broken hoop of oval/round section, tapering in width from the shoulders with an oval seating for a stone (now missing) at the bezel. L 28 mm, W 12 mm, width bezel 8 mm

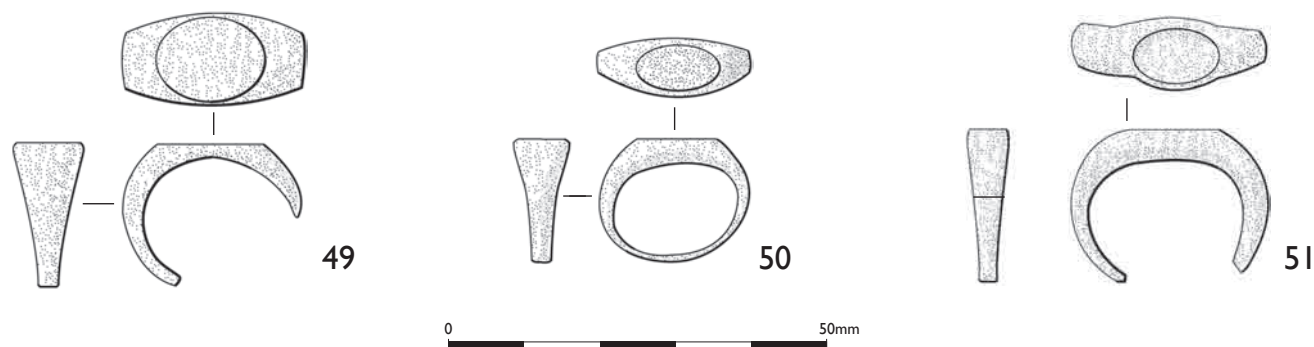


Fig 301 Personal items and dress accessories: finger rings, Func Cat nos 49–51.

(internal diam 14 mm, 20 mm in X-radiograph).
C (3068): Post Roman; SF 8445.01. Fig 301.

Intaglios

By Martin Henig

Five gems (including one from excavations in 2002) were recovered. Both stylistically, and in terms of material, they are typical of intaglios dated to the second half of the 1st century AD. Func Cat no 56 has direct military relevance, associated as it is with the victory of Roman arms, whether the figure represents Mars or a Roman soldier. However, the other intaglios would equally have represented aspects of life important to the Roman soldier and his dependents, notably to the food supply, especially an ample provision of bread, represented by the ears of corn held by the satyr (Func Cat no 55), those in the *modius* and, of course, the *modius* itself (Func Cat no 52). The scales of *Aequitas* attest equal distribution. Satyrs evoked the world of wild nature, and so the hunting of game (hence the *lagobolon*) but also, of course, the wine which Bacchus brought to humankind which is why they often hold bunches of grapes. Masks (Func Cat no 54) might also hold a Bacchic significance, whether directly as depicting the visages of satyrs or having a more general thespian significance, for Bacchus was of course associated with the theatre. Cattle which symbolised pastoral prosperity (Func Cat no 53) were often figured in early Roman art. For the Roman soldier, the sacrifice of cattle at religious festivals would have been a welcome source of meat.

- 52 Intaglio; pale chalcedony, oval with a flat upper surface with bevelled sides. Shape F4 (Henig 1974, fig 1). The device is a *modius* containing two corn ears, one on each side of a poppy head. A pair of scales lie atop the *modius*; the corn-ears and poppy symbolise the traditional crops of Rome, while the scales represent *Aequitas* (Equity); complete 12 mm × 9.5 mm × 3.5 mm. A (625) Sa <4707>: Phase 5 occupation layer; SF 8542. Fig 302.

Compare similar examples from the main drain at Bath, probably a late 1st-century cache (Henig

2007a, no 404) and from Vindolanda, from the floor of a military building abandoned c AD 120 (Henig 2007a, no App 201). Also note two gems from early (Flavian) deposits from the drain of the fortress baths at Caerleon, one a pale cornelian depicting a *modius* containing two corn-ears and a poppy head, flanked by *cornucopiae* and the other a chalcedony depicting a *modius* with a pair of scales balanced upon it and a raven perching on it (Zienkiewicz 1986c, 129 nos 2 and 3). Other examples include 1st-century examples from the Fürstenberg (*Vetera I*) by Xanten (Platz-Horster 1987, no 106) described as agate, and an onyx from a cremation at Javols (Lozère) (Guiraud 2008, no 1396). Also to be noted is an intaglio from a late 1st-century layer at Newgate/Pepper Street, Chester with two corn-ears and a poppy head in a basket (Henig 2007a, no app 200), and an example showing a wine cup with corn ears and poppy heads from the Flavian fort of Elginhaugh (Henig 2007b). An actual example of a *modius* of Domitianic date was found early in the twentieth century at Carvoran, Northumberland on Hadrian's Wall (Frere and Tomlin 1991, 58–9, no 2415.56).

53

Intaglio; pale cornelian, originally oval. Flat upper surface. Shape F1 (Henig 1974, fig 1). It depicts a bovine in profile to the left. Only the foreparts of the animal and its fore-legs remain. Above its head there is the bough of an over-hanging tree; beneath its feet, stylised grass. Broken, only the left side of the stone remains. Surviving dimensions: 8 mm × 6 mm × 3 mm. A (625) Sa <4713>: Phase 5 occupation layer; SF 8631. Fig 302.

For a bovine and overhanging tree compare chrome chalcedony from Mont Beuvray (Saône-et-Loire) (Guiraud 1988, no 681). A small chalcedony from the main drain at Bath depicts three cows in front of a tree (Henig 2007a, no 599) while a black jasper from the fort at Bainbridge, Yorkshire shows two cattle and a tree (Henig 2007a, no 600). Other intaglios from Britain depicting browsing cows include one from



Fig 302 Personal items and dress accessories: intaglios, Func Cat nos 52–56.

Brockley Hill, Middlesex of clear glass (Henig 2007a, no 597) and another from Colchester of Cornelian (Henig 2007a, no 598).

54 Intaglio; chalcedony with white upper surface on a light brownish ground, oval with a flat upper surface with bevelled sides. Shape F4 (Henig 1974, fig 1). It depicts a youthful male New Comedy mask, hair bound in a fillet, in profile to the left. Complete 9.5 mm × 8 mm × 2.5 mm. A (1216) Sa <4784>: Phase 5 fill of pit A (1256); SF 9669. Fig 302.

Comparison may be made with a garnet intaglio depicting a similar mask which was set in a gold ring, from the lower silting in the primary deposit of the drain belonging to the commandant's house at the fort of Housesteads (Henig 2007a, no 525). Of the same date are two gems with the same subject one from Herculaneum, of an opaque dark stone, and the other of cornelian from Pompeii (Pannuti 1983, nos 227 and 228). Also note two unprovenanced Augustan examples of cornelian in Cambridge (Henig 1994, nos 211 and 212). Although these gems may attest interest in the theatre, it is possible that the Chester gem was

interpreted as a satyric mask; compare a glass intaglio figuring a similar mask with a *lagobolon* below from Colchester (Henig 2007a, no 150) and a red jasper in Cambridge with a *syrix* (pan-pipes) below a mask (Henig 1994, no 285).

55 Intaglio; chrome chalcedony, cut to an oval and slightly convex Shape A1 (Henig 1974, fig 1). Abraded surface. The subject is a satyr walking to the left, holding a *lagobolon* in his left hand and two ears of corn (?) in his right hand. The cutting is fairly schematic and under magnification the cutting of the corn-ears appears highly schematic. Complete 10 mm × 8 mm × 2.3 mm. A (336): Post Roman; SF 7002. Fig 302.

Although the theme is a fairly common one (Henig 2007a, nos 160–165) the gem is of especial interest on account of the material from which it was cut and which has been the subject of recent study. Small chrome chalcedonies are relatively rare and all seem to date from Julio-Claudian times to the end of the 1st century; the probable source of these chalcedonies was the region of Eskişehir in Anatolia (Platz-Horster 2010).

A satyr holding a *lagobolon* (throwing stick as

used in hunting) and accompanied by his hound is the subject of an intaglio from a late Flavian deposit in the bath-house drain of the fortress baths at Caerleon (Zienkiewicz 1986c, 131 no 16); on one gem of the same material from another such drain in Gaul at Lons-Le-Saunier (Franche Comté) the hunting satyr holds a hare (Guiraud 1995, 379 no 12) but on another he holds a bunch of grapes (Guiraud 1995, 379 no 13). Another example of a chrome chalcedony intaglio depicting a satyr holding a bunch of grapes, here with a goat at his feet, is portrayed on an intaglio from Caesarea Maritima in Israel (Hamburger 1968, no 151) while another, unprovenanced, with *lagobolon* and *syrinx* is in the Dutch Royal Collection (Maaskant-Kleibrink 1978, no 486).

- 56 Intaglio; cut on a nicolo (an onyx with a blue upper layer on a dark ground), oval with a bevelled edge Shape F4 (Henig 1974, fig 1). It depicts a soldier in profile, clad in helmet, corselet and tunic with one arm extended to a trophy of arms. At the foot of the trophy is a shield. Not possible to say whether the figure was regarded as the god Mars, a hero such as Achilles or a generic rendering of a soldier, but it is a highly suitable find from the amphitheatre of a legionary fortress. Complete 13 mm × 10.5 mm × 4 mm. From excavations in 2002 Tr XI, (141) SF 147. The style of cutting and material and size of the gem suggests a Flavian or Trajanic date. Fig 302.

The only other gem from Britain cut with the same subject, but with body to the front, and likewise on a nicolo, is from the fortress of the second legion at Caerleon (Henig 2007a, no 77). This too is of the late 1st or early 2nd century. Other intaglios cut with the subject are known from elsewhere including from Xanten (Platz-Horster 1987, no 153), a banded agate of Augustan date. Two gems from Aquileia (Sena Chiesa 1966, nos 234 and 235), respectively agate and cornelian are of the 1st century AD, as in all probability is a cornelian in the Fitzwilliam Museum, Cambridge (Nicholls 1983, no.73). Closest in appearance in that the figure is in profile is another cornelian, in the British Museum but without provenance (Walters 1926, no 2072).

Pins

Only three pins were recovered, two of copper-alloy and one of jet, all from Post-Roman phases.

- 57 Pin. Copper alloy. Complete but bent. Flat head, 'neck' and reel, beneath which is a band of incised lattice decoration, below which are two grooves. L 86 mm; A (892): Phase 10 backfill of robber trench; SF 8123. 2nd century. Fig 303.

- 58 Pin. Shaft fragment of a jet ?pin; multi-faceted; extant L 13 mm, diam 2.2 mm tapering to 1.9 mm; C (3115) Sa <4448>: Phase 10 pit fill; SF 9737. The date of this small fragment is uncertain. It could be classified as being residual along with other Roman material from the fill of the pit, or it may in fact be of post-Roman date.

- 59 Stud/pin. Copper-alloy with cup-like concave head inset with enamel to give a domed appearance; shaft ?ovoid/D-shaped in section, broken; some mineral preserved organic material on the exterior of the shaft and 'cup'. XRF analysis of the dome-headed inset suggested high levels of lead; L c 22 mm, diam of head c 16 mm; C (3065). Post Roman; SF 9060. There are several examples of this type from Chester either with glass or enamel insets, including one from previous excavations at the amphitheatre, found in the *Nemeseum* (Thompson 1976, 195, fig 28 no 45), Hamilton Place 1971 (sf 75), Abbey Green 1975–78 (sfs 1403, 1772, 2442, 2514, 2545) and Greyfriars' Court 1976–8/1981 (sf 449) (Lloyd-Morgan 2012, 74, fig 2.38 no 1) and Deanery Field (Newstead 1928, 20 pl 9 no 5). Cf Crummy (1983 fig 28, no 484), Fox (1940, 127, fig 5 no 5) and Cool *et al* (1995, 1537, fig 716, no 6313) where they are suggested as ornament on horse trappings. Late 1st century.

Beads

Twenty-four glass or frit beads were recovered from the site, thirteen from Roman phases, nine from post-Roman phases and two are unstratified. All are melon beads, either

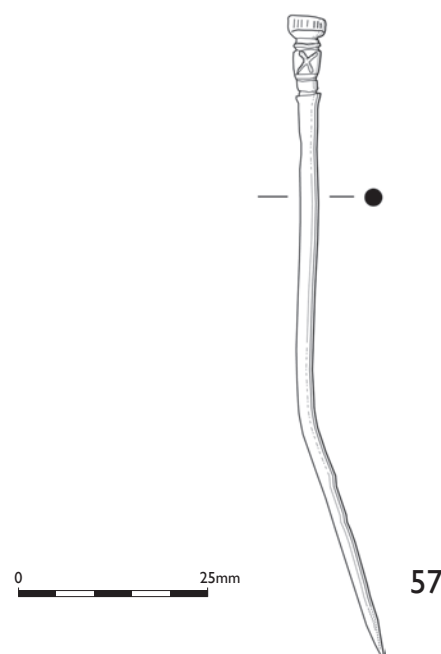


Fig 303 Personal items and dress accessories: copper alloy pin, Func Cat no 57.

of blue glass or frit and there are six complete examples. These are common finds on military sites of the 1st to mid-2nd centuries. Their condition varies, some are in good condition, others are decayed, worn and weathered. Those from Roman phases are from the Area B seating bank deposits, pit fills (particularly the cess pits of Phase 5) and from the robbing of internal walls.

There are also three amber beads – two decayed lenticular types and one barrel shaped example. Two are from the same pit fill in Phase 5, the third is from the Phase 6 seating bank.

Beads have been classified here as objects of personal adornment but it is possible that they may have had other functions, such as the decoration on horse trappings.

- 60 Bead; two joining fragments of turquoise frit melon bead; L 13 mm, D 8 mm; A (1270): Phase 4 seating bank deposit; SF 9716.
- 61 Bead; fragment of turquoise frit melon bead; L 12 mm; A (1270): Phase 4 seating bank deposit; SF 9721.
- 62 Bead; fragment of turquoise frit melon bead; no complete measurements; A (625) Sa <4683>: Phase 5 occupation layer; SF 8842.
- 63 Bead; fragment of blue glass melon bead; no complete measurements; A (1100): Phase 5 fill of cess pit; SF 9399.
- 64 Bead; fragment of turquoise frit melon bead, very decayed; L 13 mm; A (1216) Sa <4784>: Phase 5 fill of cess pit; SF 9681.
- 65 Bead. Short lenticular amber bead; very decayed; L 3.5 mm, diam 10 mm; (1216) Sa <4784>: Phase 5 fill of pit A (1256); SF 9684. Fig 304.
- 66 Bead; fragment of blue glass melon bead; no complete measurements; A (1216) Sa <4784>: Phase 5 fill of cess pit; SF 9697.
- 67 Bead. Complete amber barrel bead; slightly D-shaped with flat area on outer circumference; L 2.5–4 mm, diam 5 mm; A (1216) Sa <4784>: Phase 5 fill of pit (1256); SF 9698. Fig 304.
- 68 Bead; fragment of blue glass melon bead; no complete measurements; A (1216) Sa <4784>: Phase 5 fill of cess pit; SF 9724.

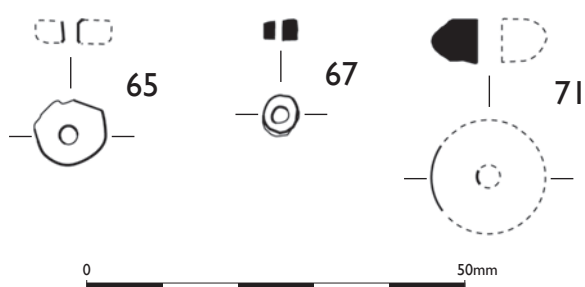


Fig 304 Personal items and dress accessories: beads, Func Cat nos in range 65–71.

- 69 Bead; fragment of turquoise frit melon bead; good condition; L 18 mm; B (2513): Phase 6 seating bank deposit; SF 8814.
- 70 Bead; fragment of frit melon bead with traces of turquoise glaze; L 14 mm; B (2498) Sa <4380>: Phase 6 seating bank deposit; SF 8840.
- 71 Bead. Lenticular amber bead, weathered; approx a quarter extant; L 5 mm, radius *c* 6 mm; B (2513) Sa <4382>: Phase 6 seating bank; SF 9224. Fig 304.
- 72 Bead; fragment of turquoise frit melon bead; L 13 mm; B (2543) Sa <4309>: Phase 6 seating bank deposit; SF 9277.
- 73 Bead; complete turquoise frit melon bead, decayed; L 11.5 mm, D 13–14 mm; C (3154): Phase 10 fill of pit; SF 8820.
- 74 Bead; complete turquoise frit melon bead, very weathered; L 12.8 mm (max), D 15.5 mm; B (2495): Phase 11a robbing of internal walls; SF 8385.
- 75 Bead; complete turquoise frit melon bead, weathered; L 13.6mm, D 15.2mm × 17mm; A (1): Post Roman; SF 7102.
- 76 Bead; half of frit melon bead with traces of turquoise glaze; L 13mm, D 15.4mm; A (1): Post Roman; SF 7103.
- 77 Bead; half of frit melon bead with traces of turquoise glaze; L 11mm, D 12.3; A (1): Post Roman; SF 7128.
- 78 Bead; complete turquoise frit melon bead; L 11.3mm, D 12 × 13 mm; A (78): Post Roman; SF 7182.
- 79 Bead; complete turquoise frit melon bead; L 12mm, D 13.5 × 14 mm; A (238): Post Roman; SF 7279.
- 80 Bead; fragment of turquoise frit melon bead; L 9 mm; A (389): Post Roman; SF 7397.
- 81 Bead; fragment of turquoise frit melon bead; L 11 mm; A (312) Sa <4044>: Post Roman; SF 7496.
- 82 Bead; fragment of turquoise frit melon bead; L 12 mm; B (2281): Post Roman; SF 7497.
- 83 Bead; fragment of turquoise frit melon bead; no complete measurements; A (505): Post Roman; SF 7505.
- 84 Bead; complete turquoise frit melon bead, some decay; L 10 mm, D 12.5 mm; B (2136) Sa <4253>: Post Roman; SF 7951.
- 85 Bead; fragment of turquoise frit melon bead; L 13.5 mm; unstratified: SF 8360.
- 86 Bead; fragment of turquoise frit melon bead; no complete measurements; unstratified: SF 8686.

Hobnails

A relatively large number of hobnails from Roman footwear were recovered from Roman contexts and is due, no doubt,

Table 70 Hobnails recovered from all phases

Phase	Area A		Area B		Area C	
	Hobnails	shanks	Hobnails	shanks	Hobnails	shanks
2	1	0	-	-	-	-
3	5	0	-	-	-	-
4	1	2	-	-	-	-
5	273	97	-	-	-	-
6	14	2	401	28	-	-
7	74	8	-	-	-	-
8	7	0	-	-	-	-
9	10	0	-	-	-	-
10	4	0	52	0	50	3
11a	7	0	14	2	0	0
11b	2	0	-	-	-	-
12	46	2++	0	0	0	0
13	0	0	2	0	0	0
14	4	1	0	0	4	0
15	0	0	4	0	0	0
16	-	-	1	0	-	-
17	-	-	3	1	-	-
18	-	-	1	0	-	-
19	-	-	2	0	-	-
20	-	-	0	0	-	-
21	-	-	1	0	-	-
U/S	2	0	0	0	0	0
Total	450	112	481	31	54	3

to the programme of sieving that was adopted; with a small amount also occurring residually within later deposits (see Table 70). They were found chiefly as individual examples as they fell out of the shoe soles during wear and, as such, reflect the amount of 'footfall' that occurred in the locality during the Roman period. Occasionally they were encrusted together in small groups possibly representing pieces of broken nailed shoe sole that had been discarded and subsequently rotted. It was possible to recognise the curved shanks broken from hobnails when the heads were missing and these are given in a separate column (shanks) in Table 70.

Relatively large numbers were recovered from a Roman occupation layer A (625), the final layer associated with the use of Amphitheatre 1a, and rubbish pit A (1256) fills in Phase 5 and from seating bank deposits B (2612) of Amphitheatre 1b (Phase 6) thought to be rubbish deriving from the legionary fortress or outlying *canabae* deposited around the turn of the 2nd century AD.

Objects associated with written communication

87 Seal box. Base of circular copper-alloy seal

box. Two perforated lugs for the hinge. Three perforations in the base. Upper edge of box has a notch on either side on an axis at right angles to the hinge/front line; mineral-preserved organics over the hinge mechanism; diam *c* 18 mm, depth *c* 7 mm. A (1202): Phase 5 fill of pit A (1256); SF 9641. Fig 305.

88 Seal box. Almost complete base of diamond-shaped copper-alloy seal box. Very corroded, no detail of hinge and two perforations can only be seen on an x-radiograph. Corner opposite the hinge missing; XRF analysis shows that the main body has a high lead content; W 23 mm, depth *c* 6mm. C (3049): Post Roman; SF 8101. Fig 305.

89 Inkwell. SG samian base, identical to that of an inkwell of form Ritterling 13, but with its base slipped and smoothed internally and so not a fully enclosed vessel; inkwell interiors were not smoothed and were often unslipped; (see Webster 1996, 72). If the internal flange of an inkwell were omitted by a potter, this might result in a beaker- or cup-like variant rather like a rounded version of form 22 (*cf* Stanfield 1936, fig 3.9). Slightly

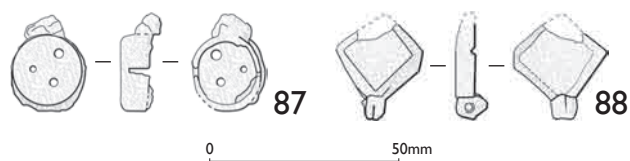


Fig 305 Objects associated with written communication: seal boxes, Func Cat nos 87–88.

burnt: smoked spots below base. Footring shows a little wear from use: 15 % at diameter 8 cm. Weight 8.5 g. B (2481): Phase 11b, fill. Flavian.

Tools

Tools were rare in the assemblage. A broken iron blade from a sturdy hand saw (Func Cat no 90) was found in the seating bank B (2542) of Amphitheatre 1b (Phase 6) (*c* AD 100). It is conceivable that it had been used in the construction of the timber seating, however, as much of the other material from seating bank deposits clearly derived from ‘off site’ this is unlikely. The saw has a centrally-placed tang, now broken, and a short, wide, tapering blade apparently ending in a blunt, rounded tip. The shape of the large teeth suggests they had been sharpened to the same angle each side and that the saw was intended to cut both on the up and the down stroke (Blandford 1974, 92 and fig 15P). The teeth do not appear to have been set but it is difficult to be certain as such fine detail is obscured by corrosion products. The saw differs from many of the Roman saw blades found in its overall size, the size of the teeth and having a tanged handle; the blades from frame saws being more commonly found. Tanged saw blades of Roman date are uncommon, a much longer and slender example was recovered along with a number of carpenter’s tools from Great Chesterford, Essex (Liversidge 1976, 161, fig 270). The curved back, rounded tip and the size and shape of the teeth can best be paralleled by the large saw blade found as part of the Corbridge hoard, buried in a wooden chest between AD 122–138, (Allason-Jones and Bishop 1988, 6 and 52–3 fig 73 no 85). The tanged saw resembles handled pruning saws in common use today and those used in carpentry for finishing and final shaping rather than the rough sawing of timbers.

A small number of simple collar ferrules that may have been used on a range of small tanged tools to help prevent the tang from splitting the wooden handle were found in Area B; three (Func Cat nos 91–93) occurring in seating bank deposits dating to *c* AD 100 (Phase 6) and a single example (SF 8727.01) associated with later robbing (Phase 11).

An ox goad (Func Cat no 94) with an open, spirally-twisted socket occurred in a mixed deposit (1152) that had slumped into an underlying rubbish pit (1256) in the south-western area of excavation, outside Amphitheatre 1 and attributed to the period of use of Amphitheatre 1a (Phase

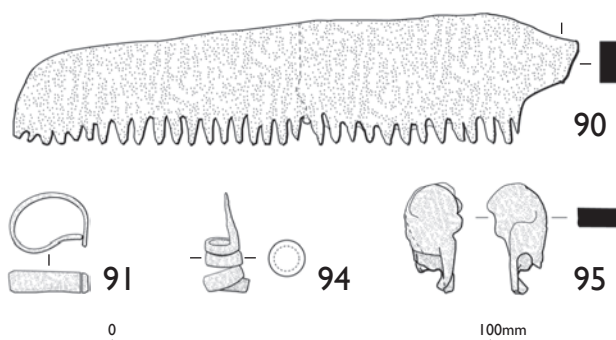


Fig 306 Tools: Func Cat nos in range 90–95.



Fig 307 Iron saw blade, Func Cat no 90.

5). There is some debate as to the use of this type of small pointed socket. The recovery at Vindolanda of an example apparently with ink staining on the point makes Birley’s suggestion of use as a dip pen difficult to refute and has been accepted by many (Howard-Davis with Whitworth 2000, 271 for example), however, the clumsiness of such an implement cannot be denied, so that its function as a goad when herding animals is preferred by some, including this author; the context of recovery of this example does not preclude either identification.

The handle of a 1st-century penknife or razor (Func Cat no 95) was found in a Post-Roman phase.

- 90 Saw blade; iron. Fractured, tapering blade with slightly curving back, and blunt, rounded end, broken across the beginning of a broad, centrally-placed tang. Large teeth, 6 mm long, 2–3 mm between each and 2.5 teeth/ per cm (measured from X-radiograph). L 150 mm, W 40 mm, tang 11 × 5 mm. B (2542): Phase 6 seating bank deposit; SF 8667.01. Drawn from X-radiograph. Figs 306, 307.
- 91 Collar ferrule; iron. Small ring of flat-sectioned strip, now distorted. Diam 18 mm, strip W 10 mm. B (2612) Sa <4381>: Phase 6 seating bank deposit; SF 9213.01. Fig 306.
- 92 Collar ferrule; iron. Angular collar of flat-sectioned strip. L 25 mm, strip W 10 mm. B (2612) Sa <4381>: Phase 6 seating bank deposit; SF 9216.02.
- 93 Collar ferrule; iron. Curved strip, broken ferrule. Diam 26mm, strip W 18 mm. B (2498) Sa <4380>: Phase 6 seating bank deposit; SF 9239.03.

- 94 Ox goad; iron. Spirally-twisted socket tapering slightly in diameter and ending in a pointed tine. L 33 mm, diam 14 mm, tine L 14 mm. A (1152): Phase 5 slumped mixed deposit; SF 9650.01. Fig 306.
- 95 Handle. Copper alloy. End of handle of a knife, possibly a penknife or razor. Semi-circular end with ridged cordon top and bottom. Openwork sides with vertical rectangular cut outs on each face. Remains of iron tang *in situ*; present L 28mm, max W (at cordons) 14 mm (measurement from an x-radiograph). C (3054): Post Roman; SF 8112. Cf Cool 1998 fig 35, no 462; Crummy 1983 fig 112, no 2938; Feugère (2003); (Blockley 1989b 102, Fig 43 no 21). 1st century. Fig 306.

Household equipment

Fastenings and fittings

A wide range of nails, pins, rivets, tacks, mounts and studs, used in the manufacture of furniture as fastenings and fittings, were recovered from Roman phases. The majority of these are from Phases 5 and 6, particularly the widespread clay layer (625) and the seating bank deposits in Area B.

A stud (Func Cat no 97) with a large, biconical head, found in the seating bank associated with Amphitheatre 1b (Phase 6) is unusual and several possible uses might be suggested, perhaps the most likely being a decorative stud from a box or a lock fitting; comparable examples can be seen on a rather grand scale in large numbers on the iron sheet covering of a wooden strongbox found in the peristyle of the villa of Lucius Crassius Tertius at Oplontis (SAP 85179, Guzzo 2003, 75). It resembles an iron pin with a biconical head found in a late 3rd to mid 4th-century occupation layer at Ickham, Kent (Mould 2010, 145 no 29) for which a possible use as a decorative crest rivet from a 'ridge' helmet of 'Berkasovo' type (Bishop and Coulston 1993, 171–2, fig 123, nos 2, 4) was tentatively suggested. This stud, having a larger head and a shorter shank, may be a better candidate for a late Roman helmet crest fitting than the Ickham example, however the early date of the context in which it was found, *c* AD100, precludes this. While the stud might be a helmet fitting of some sort a fitting from an item of furniture may be the more likely.

A fragment of riveted strip (Func Cat no 117) broken from a small fitting, perhaps from a box, came from the middle fill (3164) of a pit (3122/3171), associated with possible 5th-century occupation in the arena (Phase 10); other ironwork in the fill suggested the presence of residual material.

- 96 Stud. Fragment of head and part of shaft of copper-alloy stud. Head decorated with circles and inward radiating lines surrounded by semi-

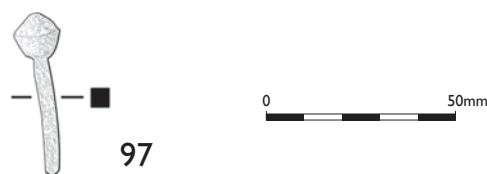


Fig 308 Household equipment: iron stud, Func Cat no 97.

- circles. A (1152) Sa <4770>: Phase 5 layer over backfilled pit; SF 9702.
- 97 Stud; iron. Stud with solid biconical head and short shank with a broken tip. L 48 mm, head W 17mm. B (2543) Sa <4319>: Phase 6 seating bank deposit; SF 9146.01. Fig 308.
- 98 Stud. Incomplete head of copper-alloy stud; slight convex moulding at the rim; shaft broken near to the head, rectangular in section; surface of head is weathered and pock-marked; diam of head 20 mm. B (2612) Sa <4381>: Phase 6 seating bank; SF 9209.
- 99 Stud. Head of copper-alloy stud with convex moulding at the rim and slightly down-turned head; shaft broken near to the head, rectangular in section; diam 12 mm. B (2513) Sa <4344>: Phase 6 seating bank; SF 9255.
- 100 Stud. Copper-alloy dome-headed stud; Head broken; shaft, square in section also broken; extant L 11.5 mm. B (2498) Sa <4364>: Phase 6 seating bank; SF 9419.
- 101 Stud. Incomplete head of flat-headed copper-alloy stud with edge slightly turned down. Only stub of square-sectioned shank remains; diam of head 24 mm. A (897): Phase 9 fill of pit; SF 8275.
- 102 Nail. Complete flat-headed copper-alloy nail; bent; L 7 mm, diam of head 4 mm. A (625) Sa <4175>: Phase 5 widespread clay layer; SF 8871.
- 103 Nail. Copper alloy. Globular head, tip missing. Shaft roughly square in section. Type used for furniture upholstery; L 24 mm, diam of head 5 mm. C (3154): Phase 10 fill of pit; SF 8823. Cf Crummy (1983 fig 116, no 2992).
- 104 Nail. Copper alloy. Bun-shaped with faceted shaft. Tip of shaft broken. Type used for furniture upholstery; L 25 mm; diam of head 9 mm (measurements taken from x-radiograph). A (526): Post Roman; SF 7427. (Cf Crummy 1983 fig 116, no 3002).
- 105 Tack. Copper-alloy flat-headed tack. Circular-sectioned shaft. Tip missing; clenched; L c 10 mm, diam of head 5 mm. A (625) Sa <4159>: Phase 5 widespread clay layer; SF 8866.
- 106 Tack. Flat-headed copper-alloy. Tip missing; shaft square in section; L 10 mm, diam of head 5 mm. A (625) Sa <4164>: Phase 5 widespread clay layer; SF 8867.

- 107 Tack. Copper alloy. Tip of a rectangular-sectioned shank; L 8 mm. A (625) Sa <4167>: Phase 5 widespread clay layer; SF 8868.
- 108 Tack. Flat-headed copper-alloy tack. Head too corroded to determine diameter (max 6 mm); L c 7 mm. A (625) Sa <4163>: Phase 5 widespread clay layer; SF 9456.
- 109 Tack. Small flat-headed copper-alloy tack. Very tip of shaft missing; shaft rectangular in section; L 10 mm; diam of head 3 mm. A (1152): Phase 5 layer over backfilled pit; SF 9687.
- 110 Tack. Flat-headed copper-alloy tack; tip missing. Shaft square in section; L 9 mm, diam of head 6 mm. A (922) Sa <4661>: Phase 6 radial timber slot; SF 8884. Tack. Complete copper-alloy flat-headed tack. Shaft square/rectangular in section; L 7 mm, diam of head 3 mm. B (2543) Sa <4337>: Phase 6 seating bank; SF 9153.
- 111 Tack. Copper alloy; square-sectioned shank with bent tip. Circular head; L 10 mm; diam of head 2 mm. A (899): Phase 7 layer sealing edge of road; SF 8130.
- 112 ?Tack or stud. Small flattened incomplete ring of copper alloy possibly from the head of a tack or stud; diam 6 mm. A (625) Sa <4683>: Phase 5 widespread clay layer; SF 8872.
- 113 Nail or tack. Copper alloy; shank, circular in section; tip extant but head missing; L 13 mm. A (625) Sa <4715>: Phase 5 widespread clay layer; SF 8878.
- 114 Tack. ?Complete flat-headed copper-alloy tack; clenched; diam of head (max) 6 mm. A (625) Sa <4708>: Phase 5 widespread clay layer; SF 9305.
- 115 ?Tack. Copper alloy; shaft only, circular in section; L 4.5 mm. A (1091) Sa <4730>: Phase 3 occupation layer; SF 9348.
- 116 Rivet. Flat-headed, copper-alloy rivet; L 2 mm, diam of head 7 mm. A (625) Sa <4174>: Phase 5 widespread clay layer; SF 8870.
- 117 Rivetted fitting; iron. Strip fragment broken at one end, gently rounded with an iron rivet passing through the other. L 20 mm, w 11 mm. C (3164): Phase 10 middle fill of pit C (3122/3171); SF 8849.03.
- 118 ?Rivet/?stud. Copper alloy. ?Head only; diam of head 6 mm. A (1075) Sa <4720>: Phase 5 occupation layer; SF 9187.
- 119 ?Rivet/stud. Small fragment of copper-alloy rivet or stud; shaft square in section; L 9 mm, W (max) 6 mm, Th up to 1 mm. B (2513): Phase 6 seating bank; SF 8710.
- 120 ?Pin. Copper alloy. Part of a pin or shank from a tack; square in section; L 9 mm. A (625) Sa <4172>: Phase 5 widespread clay layer; SF 8869.
- 121 ?Pin. Shank fragment of a copper-alloy ?pin. Circular in section; L 15 mm, diam c 1.5 mm. A

(625) Sa <4686>: Phase 5 widespread clay layer; SF 8874.

- 122 ?Pin. Shaft of copper-alloy ?pin or tapered rod, slightly bent; square in section at one end, round in middle section and diamond/flattened square at other end; tip extant but other end broken; L 73 mm. B (2513): Phase 6 seating bank; SF 8469.
- 123 ?Mount. Copper-alloy sheet cut into an oval shape with a perforation at each end. No surface detail but scratches are apparent; L 29 mm, W (max) 15 mm, Th <1 mm, diam of holes 1.5–2 mm. B (2612) Phase 6 seating bank; SF 8798.
- 124 Hinge. Complete cylindrical section of a bone hinge, broken longitudinally into two pieces. Perforated laterally through both walls of the cylinder in one axis, but not centrally along the length. Both ends sawn and smoothed. L 21 mm, diam 18 mm × 16 mm, ext diam of peg holes 8 mm × 6 mm and 6 mm × 5 mm; A (686): Phase 8 fill of construction trench; SF 7013. *See MacGregor (1985, 203–5, fig 110); ?late 2nd to early 3rd century.*

Keys and lock bolt?

An iron slide key (Func Cat no 125) of Manning's type 1 (Manning 1985, 93 and fig 25.4) was found in an intra wall deposit (2457) of the seating bank of Amphitheatre 1b (Phase 10). The key has an L-shaped bit and while the protruding teeth are obscured by corrosion products, four are visible in X-radiograph. A second Roman slide key (Func Cat no 126) was found occurring residually in a sandstone and rubble wall foundation (2430) in the middle of Area B. This example had the teeth cut from the solid bit by a series of grooves, Manning's type 2 (Manning 1985, 93 and fig 25.7). A complete copper-alloy lock was found residually in a Post-Roman phase.

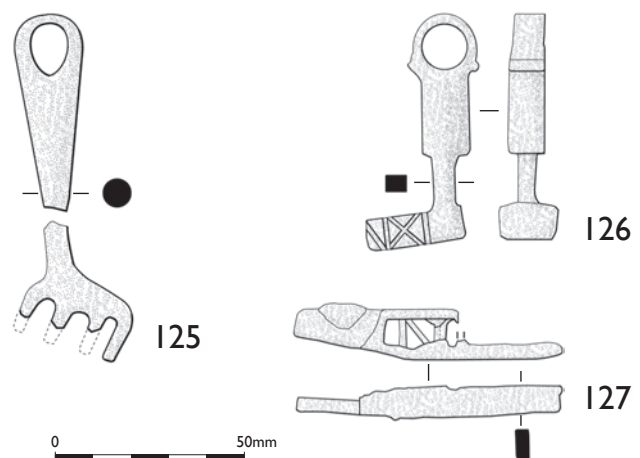


Fig 309 Household equipment: keys and bolts, Func Cat nos 125–127.

- 125 Slide key; iron. Rectangular-sectioned handle with pierced ring bit, round-sectioned stem, now fractured, and at least four long teeth projecting from an L-shaped bit. L 85 mm, W 25 mm, tooth L 22 mm. B (2457) Sa <4359>: Phase 10 intra wall seating bank deposit. SF 9142.01. Fig 309.
- 126 Slide key; iron. Rectangular-sectioned handle with large, pierced ring bit with a moulding at each side, and a large rectangular-sectioned bit at a right angle to the centrally-placed stem. In X-radiograph the bit can be seen to have seven triangular teeth formed from vertical and diagonal grooves. L 70 mm (65 mm from X-radiograph), W 19 mm. B (2430): Post-Roman; SF 8424.01. Fig 309.
- 127 Lock-bolt. Copper alloy. Complete, in two pieces. One rectangular and two triangular cut-outs. XRF analysis confirmed the presence of an inner lining of lead in the mechanism; L 73mm, W (max) 14mm; rectangular cut-out *c* 7 mm × 5mm. B (2365): Post Roman; SF 8044. Fig 309.

Lamps

There are fragments of four ceramic lamps, only one of which, in a black colour-coated fabric, is from a Roman phase.

- 128 Lamp. Small part of outer edge and wall and part of discus in a black-colour coat fabric, possibly Lyon ware; diam 70 mm; A (1216): Phase 5 fill of pit (1256); SF 9699.
- 129 Lamp. Fragment of spout in a fine orange ware fabric; C (3024): Post-Roman phase; SF 7983.

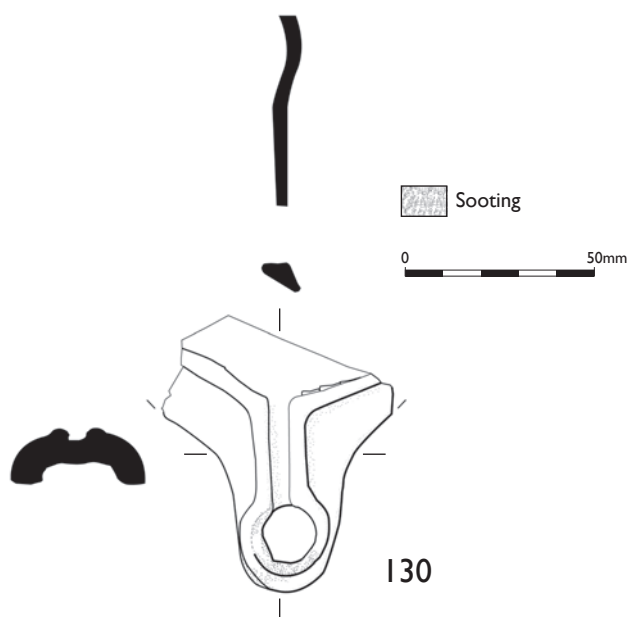


Fig 310 Household equipment: lamp, Func Cat no 130.

- 130 Lamp. Part of discus and nozzle only in a red colour coat fabric. Burning around the nozzle and fingerprints on the underside. Chester fabric ?436 from Holt; C (3045): Post Roman phase; SF 7984. Late 1st–early 2nd century. Fig 310.
- 131 Lamp. Part of rim, edge of discus and upper part of body towards nozzle in a fine grey micaceous fabric. Brown ?colour coat; some iron staining on exterior; A (598) Sa <4138>, form 1376: Post-Roman phase; SF 9207.

Structural ironwork

The relative lack of structural items, with the exception of the timber nails, was notable in the iron assemblage from Roman levels. An arm broken from a strap hinge (Func Cat no 132) was found on a fine road surface A (1028), associated with the use of Amphitheatre 1b in the 2nd century (Phase 7). A piece of wide strap (Func Cat no 133), likely to come from another, occurred in fill C (3092) of a pit C (3091) related to possible 5th-century occupation within the arena (Phase 10). It was found along with a small number of timber nails, hobnails and formless fragments, again suggesting the general ‘background’ scatter of material seen in earlier phases and likely to be residual. A small ring-headed pin (Func Cat no 134) and an arm broken from a joiner’s dog (Func Cat no 135) found in a late 1st-century seating bank deposit (2498) (Phase 6), and a small U-shaped staple (Func Cat no 136) from a fill (3115) of a shallow pit in the arena floor in Phase 10 were the only examples of each item to be recovered from Roman contexts. The ring-headed pin (Func Cat no 134), or loop-headed spike, is well-made and comparable with another 1st-century example from Hod Hill, Dorset though only half the size (Manning 1985, 130, pl 59 R31). Two split-spiked loops (double-spiked loops) were found (SF 8495.01, SF 8508.01) both occurring in late robbing in Area B (Phase 11).

Attention was paid to the possibility of structural ironwork deriving from either the fortress bath-house or a small bath-house located just outside the amphitheatre being present. Only two T-staples from the attachment of box flue tiles were recorded, occurring residually in Area C. Broken T-staple shanks were distinguishable from the shanks broken from nails of ‘medium’ size that dominated the assemblage here (see below) and it is unlikely that broken examples were not recognised so that the idea of bath house demolition debris being present on site is not supported by the iron finds recovered.

- 132 Loop hinge arm; iron. Broken hinge arm with beginning of hooked ring terminal, rounded shoulders and single nail hole remaining. L 60 mm, max W 24 mm (measured from X-radiograph). A (1028): Phase 7 road surface; SF 8752.01. Fig 311.

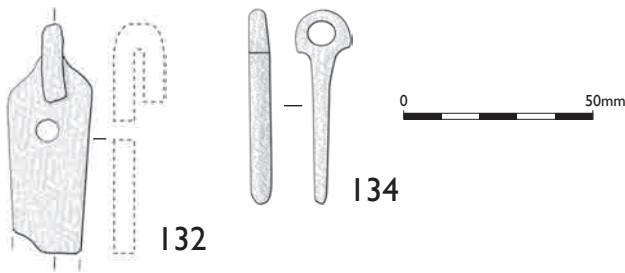


Fig 311 Structural ironwork: Func Cat nos 132, 134.

- 133 Strap; iron. Straight-sided strap fragment with part of a broken loop at one end. L 113 mm, W 30 mm. C (3092): Phase 10 fill of pit 3091; SF 8851.01.
- 134 Ring-headed pin; iron. Small angular-sectioned shank with well-formed, centrally-pierced ring terminal. L 53 mm; head W 15 mm (in X-radiograph). B (2498) Sa <4380>: Phase 6 seating bank deposit; SF 9241.01. Fig 311.
- 135 Joiner's dog; iron. Broken rectangular-sectioned shank and pointed, upstanding arm. Surviving L 29 mm, arm L 40 mm. B (2498) Sa <4380>: Phase 6 seating bank deposit; SF 9241.02
- 136 U-shaped staple; iron. Small staple with both arms broken. W 20 mm. C (3115) Sa <4448>: Phase 10 fill of rectangular pit; SF 9133.03

The timber nails

The timber nails recovered were frequently broken, often occurring as broken shanks with their heads missing. Those nails with their heads surviving had flat heads (Manning's type 1b Manning 1985, 134–7) and were mainly 50–75 mm in length, an unspecialised type that could be used widely on domestic woodworking and structural timbers; slightly larger examples, few exceeding 100 mm in length were present in small numbers, most notably associated with the timber seating structure in Phase 6. No large nails of Manning type 1a exceeding 150 mm in length, or of Manning type 2 were represented. (For nails from the timber-framed seating see p 118.)

Medical and toilet implements

This category encompasses those artefacts used for pharmaceutical or medical purposes as well as personal hygiene. Items such as spatulae, probes and *ligulae* could have been used by doctors as medical equipment for a range of functions including the preparation and application of medicines and ointments as well as for the preparation and application of cosmetics.

- 137 Toilet spoon. Copper alloy. Long shallow V-shaped scoop; tip of scoop broken off. Shaft is diamond-shaped in section. Above the scoop, on the shaft is

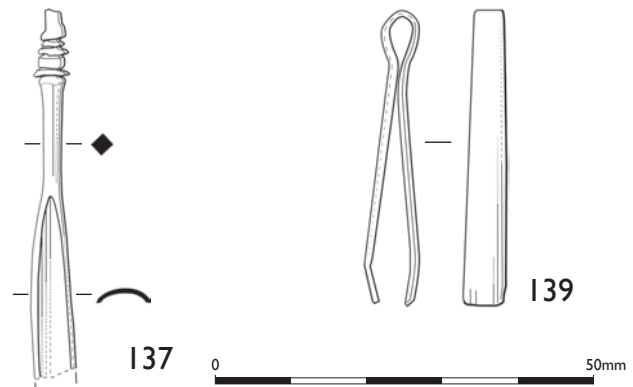


Fig 312 Medical and toilet implements: Func Cat nos 137, 139.

- a 7mm length of bead and reel moulding. Shaft the other side of the moulding is circular in section; present L 49 mm, scoop 5 mm wide. (126): Phase 7 fill of pit A (125); SF 7192. Cf Crummy (1983 fig 64, no 1921). Fig 312.
- 138 ?Toilet spoon. Six pieces of copper-alloy 'rod'; possible that some are from the same object but no obvious joins. The end of one fragment is pointed, the end of another, spatulate, suggesting a toilet spoon. Three fragments polygonal in section; other three too corroded to determine; L 7 mm, 16 mm, 17 mm, 18 mm, 38 mm, spoon L 30 mm, diam of scoop 5 mm. B (2565): Phase 11b robber trench fill; SF 9409. Cf Crummy (1983 fig 64, nos 1901, 1907).
- 139 Tweezers. Complete but very corroded copper-alloy tweezers. Rectangular-sectioned strip bent in half to form small loop; straight-edged inturned jaws. Two incised lines run parallel to length of body with other lines running off from these; L 39 mm, max W of arm 5 mm (measurements taken from x-radiograph). A (332): Post Roman; SF 7342. Fig 312.

Recreation

Counters (Fig 313) and a possible gaming board or abacus are the only items to be associated with this category, and are found in glass, ceramic and bone. The majority are made of glass, in total fifty were recovered, forty-one of which are complete, from Phases 6, 10, 11a and 11b. Forty-seven of the glass counters are from the Phase 6 Area B seating bank deposits. All are plano-convex though some are slightly irregular in shape. This type was in use throughout the Roman period and are commonly found on 1st and 2nd century sites. Many have a pitted base, some are chipped and weathered or scratched whereas others are in a generally good condition. Their colours range from white, green, blue/black and amber/brown.

The eight ceramic counters have been fashioned from



Fig 313 Recreation: group of glass, bone and samian counters.

samian, coarse orange, grey and black-burnished wares. One of the six bone counters has an inscription (Func Cat no 192) on the obverse and one has been burnt.

Counters were used in games and hence have been included in the category of 'Recreation', however, it is also possible that they were used for accounting.

- | | | | |
|-----|---|-----|--|
| 140 | Counter. Almost complete plano-convex white glass counter. Bubbly and chipped on upper surface and base; diam 14 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(i). | 142 | Counter. Complete plano-convex white glass counter with pitted base; diam 14.5 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(iii). |
| 141 | Counter. Complete, slightly irregular plano-convex white glass counter; diam 13 × 15 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(ii). | 143 | Counter. Complete, slightly irregular plano-convex white glass counter; diam 13 × 15 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(iv). |
| | | 144 | Counter. Complete plano-convex white glass counter with pitted base; diam 15 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(v). |
| | | 145 | Counter. Complete plano-convex white glass counter with pitted base; bubble/hole on upper face near to edge; diam 15 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(vi). |

- 146 Counter. Complete plano-convex white glass counter with pitted base; diam 13 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(vii).
- 147 Counter. Complete irregular plano-convex white glass counter; very good condition but bubbly base; diam 14 × 17 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(viii).
- 148 Counter. Fragment of plano-convex white glass counter with pitted base; B (2513): Phase 6 seating bank deposit; SF 8797(ix).
- 149 Counter. Complete, slightly irregular plano-convex white glass counter; pitted uneven base, slight iridescence; diam 11.5 × 12.5 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(x).
- 150 Counter. Complete plano-convex white glass counter with pitted base; diam 14 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xi).
- 151 Counter. Complete plano-convex white glass counter with pitted base; diam 13.5 × 14.5 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xii).
- 152 Counter. Complete irregular plano-convex white glass counter with pitted base; translucent; diam 15.5 × 18.5 mm, th 7 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xiii).
- 153 Counter. Complete plano-convex white glass counter; very good condition, smooth base; diam 15.5 × 16.5 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xiv).
- 154 Counter. Complete plano-convex white glass counter with pitted base; diam 13 mm, th 5.5 mm; B (2513) Phase 6 seating bank deposit; SF 8797(xv).
- 155 Counter. Complete plano-convex white glass counter with roughened base; diam 12.5 mm, th 5.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xvi).
- 156 Counter. Complete (in two pieces) plano-convex white glass counter; very bubbly and iridescent on cross-section; pitted and uneven underside; diam 18.5 × 20.5 mm, th 7 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xvii).
- 157 Counter. Complete plano-convex dark green/blue/black glass counter; iridescent; pitted base; diam 13 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xviii).
- 158 Counter. Complete plano-convex blue/green/black glass counter; dull surface and pitted base; diam 14.5 mm, th 5.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xix).
- 159 Counter. Complete plano-convex blue/green/black glass counter; iridescent; diam 17 × 18 mm, th 7 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xx).
- 160 Counter. Complete plano-convex blue/green/black glass counter with pitted base; diam 14 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxi).
- 161 Counter. Complete plano-convex blue/green/black glass counter with pitted base; diam 15.5 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxii).
- 162 Counter. Complete irregular plano-convex blue/green/black glass counter; dull surfaces and pitted base; diam 12 × 14 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxiii).
- 163 Counter. Complete plano-convex blue/green/black glass counter; iridescent, slightly roughened pitted base; diam 18.5 × 20 mm, th 7 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxiv).
- 164 Counter. Complete plano-convex blue/green/black glass counter; dulled surface and pitted base; diam 15.5 mm, th 7.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxv).
- 165 Counter. Almost complete plano-convex blue/green/black glass counter; chipped on edge showing air bubbles; iridescent; pitted base; diam 17 mm, th 7 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxvi).
- 166 Counter. Complete plano-convex blue/green/black glass counter; air bubbles; pitted and uneven base; diam 13 × 14 mm, th 7.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxvii).
- 167 Counter. Approximately half irregular plano-convex blue/green/black glass counter; iridescent; pitted base; diam 17.5 mm, th 7 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxviii).
- 168 Counter. Complete plano-convex blue/green/black glass counter; air bubbles and iridescent; pitted base; diam 18 × 19 mm, th 7.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxix).
- 169 Counter. Complete plano-convex blue/green/black glass counter; iridescent; pitted base; diam 13.5 × 14.5 mm, th 7 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxx).
- 170 Counter. Complete plano-convex blue/black glass counter; iridescent; pitted and uneven base; diam 16.5 × 17.5 mm, th 7 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxxi).
- 171 Counter. Complete plano-convex blue/black glass counter; weathered and decayed surface, air bubbles; pitted base; diam 15 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxxii).
- 172 Counter. Complete plano-convex brown/blue glass counter with pitted base; diam 14 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxxiii).
- 173 Counter. Complete plano-convex dark blue glass counter with pitted base; diam 13.5 × 14 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxxiv).

- 174 Counter. Almost complete plano-convex blue glass counter; chipped on edge and base showing air bubbles; dulled surface, pitted base; diam 15.5 mm, th 6.5 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxxv).
- 175 Counter. Complete plano-convex blue glass counter with pitted base; diam 13.5 × 14.5 mm, th 7 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxxvi).
- 176 Counter. Complete plano-convex blue glass counter; translucent; pitted and scratched base; diam 12 × 12.5 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxxvii).
- 177 Counter. Complete irregular plano-convex blue glass counter; dulled surface; diam 14 × 15.5 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxxviii).
- 178 Counter. Complete plano-convex ?glass counter; white interior but brown surface; diam 14.5 mm, th 6 mm; B (2513): Phase 6 seating bank deposit; SF 8797(xxxix).
- 179 Counter. Almost complete plano-convex amber/brown glass counter; chipped and weathered; diam 15 mm, th 7 mm; B (2513) Sa <4382>: Phase 6 seating bank deposit; SF 8836(i).
- 180 Counter. Fragment of irregular plano-convex ?black glass counter; iridescent; B (2513) Sa <4382>: Phase 6 seating bank deposit; SF 8836(ii).
- 181 Counter. Two fragments of a complete plano-convex dark blue counter; slightly irregular with pitted base; diam 17.5 × 18 mm, th 7 mm; B (2513) Sa <4382>: Phase 6 seating bank deposit; SF 8836(iii).
- 182 Counter. Complete plano-convex ?black glass counter. Good condition but with pitted base, iridescent; diam 15 mm, th 7 mm; B (2513) Sa <4382>: Phase 6 seating bank deposit; SF 8836(iv).
- 183 Counter. Complete plano-convex counter; blue translucent with white streaks; diam 12 × 14 mm, th 6.5 mm; B (2513) Sa <4382>: Phase 6 seating bank deposit; SF 8836(v).
- 184 Counter. Black glass counter. No measurements available; B (2612): Phase 6 seating bank deposit; SF 9228.
- 185 Counter. Complete plano-convex blue glass counter with dulled surface and pitted base; diam 15 × 15.5 mm, th 7 mm; B (2612) Sa <4381>: Phase 6 seating bank deposit; SF 9236.
- 186 Counter. Almost half of plano-convex light-green glass counter, bubbly and with roughened base; th 7 mm; B (2498) Sa <4380>: Phase 6 seating bank deposit; SF 9917.
- 187 Counter. Complete plano-convex blue glass counter, roughened base; diam 10 mm, th 5.6 mm;



Fig 314 Recreation: Inscribed bone counter, Func Cat no 192.

- B (2457) Sa <4379>: Phase 10 layer above post-pad structures; SF 9916.
- 188 Counter. Complete plano-convex white glass counter; diam 16 mm, th 6.5 mm; B (2444): Phase 11a robbing of internal walls; SF 8482.
- 189 Counter. Complete plano-convex in a blue or dark green glass; base very worn and surface weathered; diam 15.5 mm, th 6.5 mm; B (2503): Phase 11b robber trench fill; SF 8483.
- 190 Counter. Plain bone counter turned on a lathe; flat upper and lower surfaces with a bevelled edge. Indentation from lathe centre on obverse. Some damage on obverse edge but worn smooth; diam 19 mm, th 4.5 mm; B (2513): Phase 6 seating bank; SF 8800a. Kenyon type A (Kenyon 1948, 266 and fig 91); Crummy type 1 (Crummy 1983, 91 and fig 94). 1st century.
- 191 Counter. Plain bone counter turned on a lathe; flat upper and lower surfaces with a bevelled edge. Indentation from lathe centre on obverse. Some damage on obverse edge but worn smooth; diam 19 mm, th 5 mm; B (2513): Phase 6 seating bank; SF 8800b. Kenyon type A (Kenyon 1948, 266 and fig 91); Crummy type 1 (Crummy 1983, 91 and fig 94). 1st century.
- 192 Counter. Plain flat bone counter turned on a lathe; flat upper and lower surfaces with a double-bevelled edge and a chuck-hole in the centre of one face. To the right of this has been scratched a vertical line, met by two others which form an obtuse angle: K. All the letters of the alphabet are found singly or in pairs on bone roundels, probably as marks of ownership (*RIB* II.3, 2440 (a), 105–8). For an example of K from Caerwent, see *RIB* II.3, 2440.46 (pers comm R Tomlin); diam 19 mm, th 4.5 mm; B (2513): Phase 6 seating bank; SF 8800c. Kenyon type A (Kenyon 1948, 266 and fig 91); Crummy type 1 (Crummy 1983, 91 and fig 94). 1st century. Fig 314.
- 193 Counter. Plain bone counter turned on a lathe; flat upper and lower surfaces with a bevelled edge. Deep indentation from lathe centre on obverse; diam 18–19 mm, th 3.5 mm; B (2498) Sa <4380>: Phase 6 seating bank; SF 8832. Kenyon type A (Kenyon 1948, 266 and fig 91); Crummy type 1 (Crummy 1983, 91 and fig 94). 1st century.
- 194 Counter. Plain bone counter turned on a lathe; flat upper and lower surfaces with a bevelled edge.

Indentation from lathe centre on obverse; diam 19–20 mm, th 4 mm; B (2513) Sa <4382>: Phase 6 seating bank; SF 8837. Kenyon type A (Kenyon 1948, 266 and fig 91); Crummy type 1 (Crummy 1983, 91 and fig 94). 1st century.

- 195 Counter. Approximately half of a plain bone counter, white due to burning. Flat upper and lower surfaces with bevelled edge; diam 15.8 mm, th 3.4 mm; B (2513) Sa <4382>: Phase 6 seating bank; SF 9143. Kenyon type A (Kenyon 1948, 266 and fig 91); Crummy type 1 (Crummy 1983, 91 and fig 94). 1st century.

- 196 Counter. SG samian of indeterminate form, probably dish rather than cup. Re-worked unusually from the wall/base junction; diam 15 mm; th *c* 5 mm thick. B (2612) Sa <4381>: Phase 6 seating bank deposit; SF 9158. Vessel produced *c* AD 70–100/110.

- 197 Counter. SG samian ind. Very neatly rounded; diam 13 mm; th *c* 4 mm; C (3059): Post-Roman phase; SF 8218. A Flavian vessel.

- 198 Counter. SG samian dish 18R. Very neatly rounded; diam 15 mm, th now only *c* 2 mm. Derived from the base, it lacks its external surface, which has been removed and levelled, with the wall/base junction perhaps flattened down. C (3066): Post-Roman phase; SF 8273. A Flavian dish.

- 199 Counter. SG samian ind. Probably an attempt at counter, roughly hewn and incomplete if so; diam 15–16 mm; th *c* 5 mm; C (3084) <4549>: Post-Roman phase; SF 9130. A vessel produced *c* AD 70–110.

- 200 Counter. Base of coarse orange ware vessel; max diam 35mm, th 12–17mm; A (485): Phase 11a fill of robber trench; SF 7432. 1st–early 2nd century.

- 201 Counter. Base of coarse orange ware vessel; max diam 43 mm; B (2472): Phase 11b fill of robber trench; SF 9897. 1st–early 2nd century.

- 202 Counter. Base of black-burnished ware vessel; max diam 33 mm; C (3044): Post-Roman phase; SF 8050. AD 120+.

- 203 Counter. Body sherd of coarse grey ware; diam 20 mm; C (3081): Post-Roman phase; SF 8465. 1st–early 2nd century.

- 204 Disc or roundel. CG samian dish, form indeterminate; wallsherd, *c* 9 mm thick, is presumed to have been roughly hewn, but appears unfinished. Now broken, it was originally of diam *c* 35 mm. Weight 12 g. A (1): Post-Roman; SF 10046. Antonine.

- 205 CG dish or platter, form Walters 79 or 79R (Sam Cat no 136). Roger Tomlin comments that the basal interior exhibits short scratches lying at right angles to two parallel lines, deliberately scored 13 mm apart (for its possible function as abacus

or gaming-board, see p 241). See also Sam Cat 136. Figs 268, 269.

Weights and measures

- 206 ?Weight; conical piece of lead, oval in cross-section but tapering; off-centre hole. Some diagonal cut marks on external surface; L *c* 30 mm, max diam 19 mm, diam of hole 5 mm, weight 46 g; A (1036): Phase 5 metallated surface; SF 8634.

Buildings and services

Window glass

A total of 170 fragments of window glass was recovered from the excavations, 47.6 % of which are from Roman phases (Table 71). All fragments are of the matt-glossy type, indicating that they were cast in a shallow mould or tray, producing a granular, matt surface, which is characteristic of the 1st–3rd centuries. A few fragments are matt on both surfaces but this is probably due to weathering. The ‘matt-glossy’ window had gone out of production by the end of the 3rd century, to be replaced by transparent cylinder-blown panes. None of this type was identified but

Table 71 Number of fragments of window glass from all phases.

Phase	Number of fragments
Unstratified	3
3	0
4	0
5	10
6	64
7	6
8	1
9	0
10	3
11a	5
11b	1
12	8
13	3
14	5
15	42
16	8
17	3
18	1
19	5
20	0
21	2
Total	170

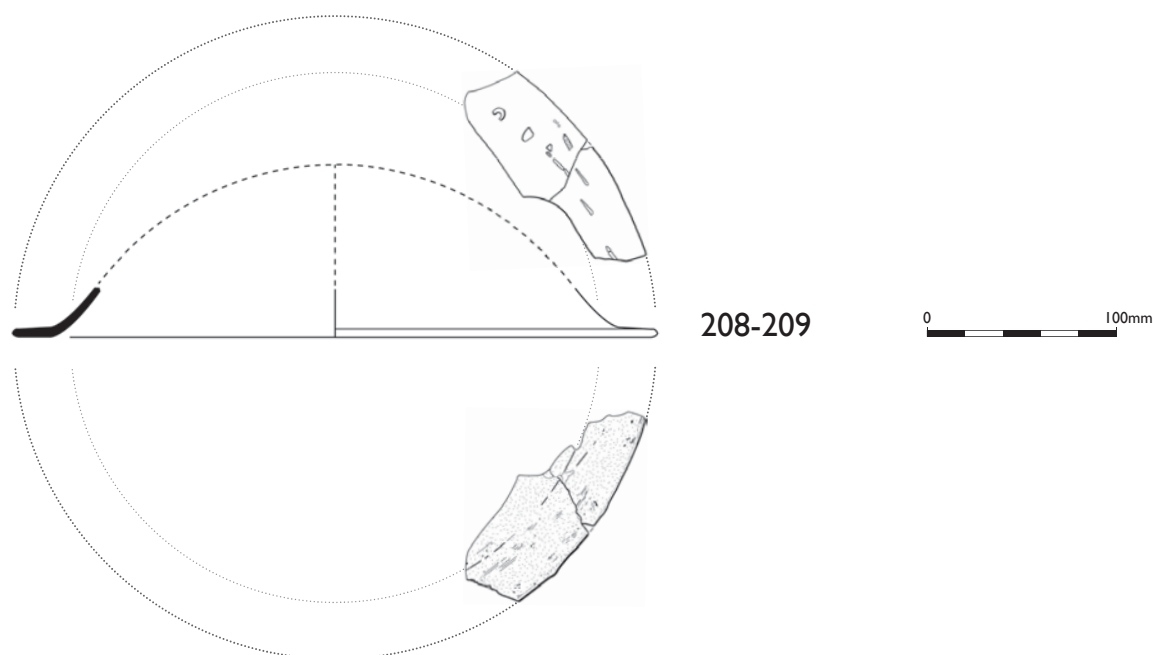


Fig 315 Buildings and services: domed window pane, Func Cat nos 208, 209.

it should be noted it is possible that very small fragments could be amongst the bottle glass assemblage. In general the condition of the glass is good but some pieces have strain cracks, bubbles and internal impurities. The majority of the fragments are bluish-green in colour but there are also examples of green-tinged colourless, light and pale green and colourless. Twenty-seven (16 %) of the fragments have pane edges, including one corner piece and six with curving edges, including examples of domed window-panes (see below). The largest piece present is 155 mm in length, from B (2431), a dump of rubbish associated with the construction of the seating bank. The thickness of the panes generally ranges between 2 and 5 mm, though there are a few pieces which are as much as 6 or 6.5 mm thick towards the edge of the pane. Some fragments show tool marks and slight indentations, others have mortar adhering. One fragment has possible grozing on one edge, carried out to re-shape pieces of glass for re-use or to fit a particular-sized aperture.

Seventy-nine per cent of the window glass from Roman phases is from the Phase 6 seating bank in Area B – confirming that this material constitutes general rubbish from the fortress and/or *canabae*. The rest of the assemblage is from a range of contexts including pit fills, gravel surface, two fragments from the shrine, road surface, fill of construction trenches and robbing deposits. A record of all fragments is held in the site archive.

Domed window-panes

Amongst the window glass are nine fragments from circular panes, at least three of which are from domed windows. These include three fragments from Phase 5, from A (1216),

the fill of rubbish pit (1256). There is one piece from C (3068) Phase 13, and two joining pieces from B (2191) Phase 16 and B (2109) Phase 17. There are three further fragments in the assemblage which have the same general appearance as the positively identified pieces, including tool marks and hence could be from the broad rim of the domed panes, even though they lack an edge (Func Cat nos 207–209).

The profile of these pieces, achieved by sagging the circular pane over a former, has a flat rim 30–35 mm wide, which then curves upwards to form an inverted ‘bowl’ shape (Fig 315; Foy and Fontaine 2008, fig 8). All of the fragments are blue-green in colour and matt-glossy with rough pitted undersides. A fragment from B (2191) and one from B (2109) are definitely domed (Fig 315, Func Cat nos 208, 209); the fragments from (1216) are possibly domed but are broken just at the junction of the flat rim and convex dome. The fragments from (2109) and (2191) join, making up *c* 123 mm of its circumference (Figs 315, 316). The diameter of this pane is 340 mm, though the edge of the rim is irregular. There is mortar adhering to all the rim pieces, in some cases on both surfaces, and on the rim edges.

Domed window glass is an unusual find in Britain. Comparative examples from Romano-British sites come from Caerwent, Southwark and Corbridge. The Caerwent pieces, found during excavations in the forum, have all the characteristics of those from the amphitheatre – blue-green in colour, cast matt-glossy with a granular underside, with tool marks on the glossy upper surface but are somewhat larger with a diameter of *c* 500 mm (Allen 2002, 108, fig 8.8). The context in which they were found, a layer used



Fig 316 Domed window pane, Func Cat nos 208, 209.

to build up the floor level of a shop, and their association with other building materials, in the first quarter of the 2nd century, suggests that the building from which the glass came must have been demolished during or before this period (*ibid*, 108).

Six fragments from Southwark (published as wide shallow dishes or plates) are similarly natural blue or greenish-blue in colour. The edges of the rim are naturally rolled and one side of the rim carries tool marks. A date of the late 1st or 2nd century is suggested (Shepherd 1992, 124, fig 38 nos 48, 49). The pieces from Corbridge were recovered during excavations of the bath-house at Red House, Beaufront, and belong to the earliest, Flavian occupation (J Price, pers comm).

Parallels elsewhere come from Spain – Labitolosa, Zaragoza and Asturica Augusta; Portugal, Switzerland, France and the Netherlands and there are *in situ* fragments in the forum baths at Herculaneum (Allen 2002, fig 8.7), but perhaps the most spectacular discovery was from an early 3rd-century shipwreck off the Provençal coast in 2003 when several complete examples were recovered. These are colourless and ‘naturally colourless’ domed panes, 400–520 mm in diameter (van den Dries 2006a; Foy and Fontaine 2008, figs 8.1 and 10). There are also three smaller complete examples with a diameter of *c* 250 mm in the Campana collection, now housed in the Louvre.

The Roman baths at Heerlen in the southern Netherlands has also produced comparative examples with a diameter of *c* 300 mm, with a flat brim of more than 35 mm wide and tool marks, with a slightly uneven curvature of the dome. Van den Dries (2006a; 2006b, 327) suggests that the location of the glass, near the bath-house, is unlikely to be coincidental and suggests that it came from the *sudatorium*. The bath-house itself was built in the *vicus* using bricks stamped with the insignia of the Legion XXX, who were stationed at Xanten after AD 120, a date which concurs with other finds of domed window panes.

- 208 with traces of brown mortar and tool marks on the rim. Three flat fragments with tool marks; min D 240 mm, max width of rim 35 mm, th 3–5 mm; A (1216): Phase 5 fill of pit A (1256); SF 10190 Window. Part of rim and dome of a circular domed window pane. Blue-green, matt-glossy with rough-textured underside. Traces of mortar on both surfaces at the edge of the rim. Tool marks, concentrated at the junction of the rim and base of the dome. Joins with a fragment from B (2109) SF 10188; D *c* 340 mm, width of rim *c* 30 mm, th 3mm on dome, 5 mm on rim; B (2191): Post-Roman; SF 10187. Figs 315, 316.
- 209 Window. Part of rim and dome of a circular domed window pane. Blue-green glass, matt-glossy with rough underside. Traces of mortar on glossy side. Tool marks on the rim. Joins with a fragment from B (2191) SF 10187; D *c* 340 mm, width of rim *c* 30 mm, th 3–4 mm; B (2109): Post-Roman; SF 10188. Figs 315, 316.
- 210 Window. Fragment of curved window pane. Irregular edge. Blue-green, matt-glossy. Not enough survives to say whether domed or not. Tool marks. Trace of mortar on underside; min diam 300 mm, th 4–5 mm; C (3068): Post-Roman; SF 10189.

Structures associated with food preparation

Portable ovens

By Alison Heke

Introduction

Fragments of portable ovens were identified among the ceramic building material assemblage. The only previously published examples of these objects from Chester are a thumb-impressed rim fragment from 25 Bridge Street (Jones 2008, 170, ill 5.1.5) and five wall fragments (the exterior surfaces are mainly decorated with diagonal finger-wiping, apart from one, which has a plain exterior surface) from Delamere Street (Heke 2012a, 77 fig 2.26). A thumb-impressed rim was also recovered unstratified from the amphitheatre in 1966 but was incorrectly identified and published as the rim of a large medieval ?storage jar (Thompson 1976, 216, 217 fig 41.58). A smaller, possibly related, group has also been recovered from excavations at nearby Grosvenor Park, close to a substantial Roman road aligned with the east entrance of the amphitheatre (Garner 2007b, 3).

Quantity

The site produced a total assemblage of 30 fragments of Roman portable oven in an oxidised ‘tile’ fabric, weighing 3,214 g, with an average fragment weight of 107.1 g. 96.3 % by weight of the assemblage was hand-collected, 3.7 % came from sample residues. Area A produced the

- 207 Window. Five fragments, two with curved rims of circular domed pane. Blue-green, matt-glossy

Table 72 Roman portable oven fragments by Area.

Form	A			B			C			Total		
	No	Wt (g)	Av frag wt (g)	No	Wt (g)	Av frag wt (g)	No	Wt (g)	Av frag wt (g)	No	Wt (g)	Av frag wt (g)
Portable oven	12	1543	128.6	9	552	61.3	9	1119	124.3	30	3214	107.1

largest assemblage by weight, with 48 % of the total, followed by Area C (34.8 %) and Area B (17.2 %). None was found unstratified. The fragments retrieved from Area B are more broken than those from Areas A and C, both of which have similar average fragment weights (Table 72).

Range and variety

A range of forms was recovered, as attested by the number of diagnostic elements present. If all pieces have been correctly identified, at least three ovens are present in the group. These comprise examples with an exterior surface decorated with diagonal finger-wiping; a single example with ?combed diagonal markings; and others with a plain surface with no obvious form of decoration. Some of these fragments appear roughly finished, others have clear smoothing/wiping marks, which often appear vertical but are sometimes random in direction. It is of course possible that the diagonal finger-wiping or ?combing did not necessarily extend over the entire surface, although the two known near-complete examples were both decorated in this way. Two base fragments have also been retrieved. One has a stepped or flanged base with a sanded underside and a plain exterior surface; the other has a plain base with a sanded underside and the edge of a knife-cut opening, comparable to that shown on the oven from Prestatyn (Fig 322; Blockley 1989c, 164 fig 87). A wall fragment from Phase 6 also has the knife-trimmed edge of a plain opening and may be from the same oven. Neither piece exhibits the decorative ‘moulded edge and thumb impressions around’ of the semi-circular opening at the base of the Holt oven (Grimes 1930, 184 and 212, fig 60.9). Although no rim fragments were recovered, an example of a thumb-impressed rim, which appears to be typical of the type, was recovered from excavations at the amphitheatre in 1966, although unfortunately it was found unstratified (Thompson 1976, 216 and 217, fig 41.58).

Condition

The assemblage is of mixed condition, ranging from fresh to abraded and weathered. This mix occurs both across the site and within contexts. It suggests an assemblage formed from fragments buried soon after disposal alongside material exposed to surface movement and weathering prior to burial. There are differences in condition between the trenches. The assemblage from Area C is much fresher (77.8 %) and less abraded (22.2 %) than that from either Areas A or B, both of which produced roughly similar proportions of fresher (Area A: 58.3 %; Area B: 55.5 %) and more abraded (Area A: 41.6 %; Area B: 44.4 %) material.

There is also a difference in the proportion of burnt material, particularly between Areas A (8.3 %) and B (33.3 %). Area C produced slightly less burnt material (22.2 %) than Area B, but much more than Area A, which also produced the only examples (16.7 %) of re-used material (ie fragments with mortar attached to broken edges), including one example from Phase 5. This difference is quite marked, both spatially and chronologically, in the ceramic building material assemblage as a whole, indicating that a much higher proportion of re-used material was deposited in the Roman period in Area A than elsewhere on the site.

Provenance and date range

Portable ovens were produced at the legionary tile and pottery kilns at Holt, situated 12 km south of the fortress, which were established by *legio* XX shortly after its arrival in Chester from Scotland. The kilns are thought to have been in production from *c* AD 90 (Carrington 2012b, 378). Recent detailed study of the samian and coins from Holt show that occupation continued until *c* AD 135 and then carried on at a lower level through the rest of the 2nd century. A detachment of the *Cohors I Sunicorum* is also attested at Holt, perhaps towards the end of the 2nd century, when the unit was based at Caernarfon (Carrington 2012b, 378). Although it is not certain when production ended at Holt, it is clear that the Twentieth Legion or its contractors continued to produce ceramic building material into the early 3rd century, as attested by the presence of *Antoniniana* tiles, none of which have been recovered from Holt (Warry 2006a, 80; 2010, 138).

Catalogue

Roman phases (Table 73)

Roman phases produced five fragments of portable oven with a weight of 245 g and an average fragment weight of 49 g. In terms of both fragment count and weight, most of the Roman phased assemblage (80.0 % by count and 95.1 % by weight) was retrieved from Area B, with 20 % by count and just 4.9 % by weight from Area A.

- 211 Portable oven; wall fragment with smooth exterior surface; re-used in Roman period Patches of pale brown sandy mortar (some partially vitrified) attached to surfaces and broken edges; Th: 18 mm. A (1077): Phase 5 fill of cess pit; SF 9831. Fig 317.
- 212 Portable oven; wall fragment with burnt interior

Table 73 Roman phases: spatial and chronological distribution of Roman portable oven fragments.

Phases present	Area A			Area B			Total		
	No	Wt (g)	% wt Area A	No	Wt (g)	% wt Area B	No	Wt (g)	% wt
5	1	12	0.8	0	0	0	1	12	4.9
6	0	0	0	4	233	42.2	4	233	95.1
Total	1	12	0.8	4	233	42.2	5	245	100

and exterior surfaces and margins; smoothed interior surface; roughly finished exterior surface with both diagonal and horizontal wiping; Th: 30 mm. B (2513): Phase 6 seating bank deposit; SF 9853. Fig 317.

213 ?Portable oven; wall fragment with exterior smoothed with distinctive wipe-marks; sooted patches on exterior; Th: >24 mm. B (2513): Phase 6 seating bank deposit; SF 9900. Fig 317.

Discolouration from fire contact can result from several different processes. Black discolouration on the exterior surface is caused by sooting, a by-product of fuel combustion. Blackening of the interior surface is generally the result of charring from the carbonisation of food particles, and the level of opacity (ie the darkness of blackening) indicates the intensity with which a pottery vessel or clay oven has been used (Banducci 2013, 89–90 and 98).

214 ?Portable oven; wall fragment with finger-wiping on exterior surface; interior surface missing. B (2513): Phase 6 seating bank deposit; SF 100085.

215 Portable oven; wall fragment with finger-wiping and fingerprints on exterior surface; trimmed edge of opening?; Th: 21 mm. B (2543): Phase 6 seating bank deposit; SF 9745. Fig 317.

Phases 10–11b: Amphitheatre 2 change of use and robbing (Table 74)

216 Portable oven; two adjoining wall fragments with diagonal finger-wiping on exterior; smooth interior surface; Th: 21 mm. A (852): Phase 10 fill of robber trench; SF 9740. Fig 318.

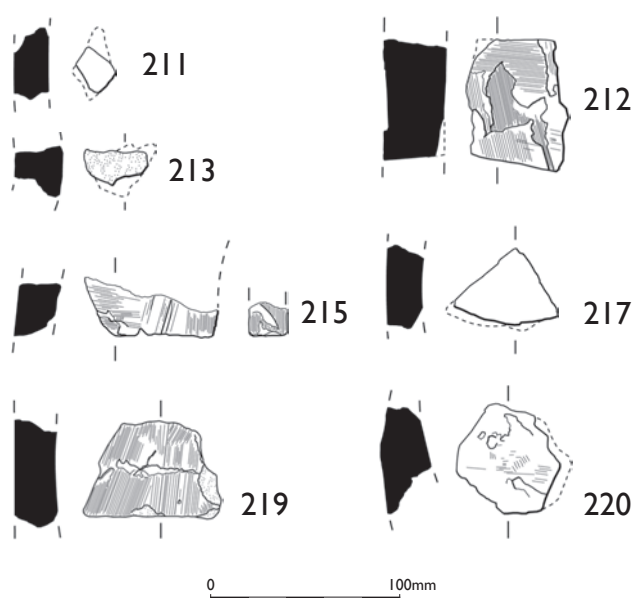


Fig 317 Portable oven fragments, Func Cat nos in range 211–20.

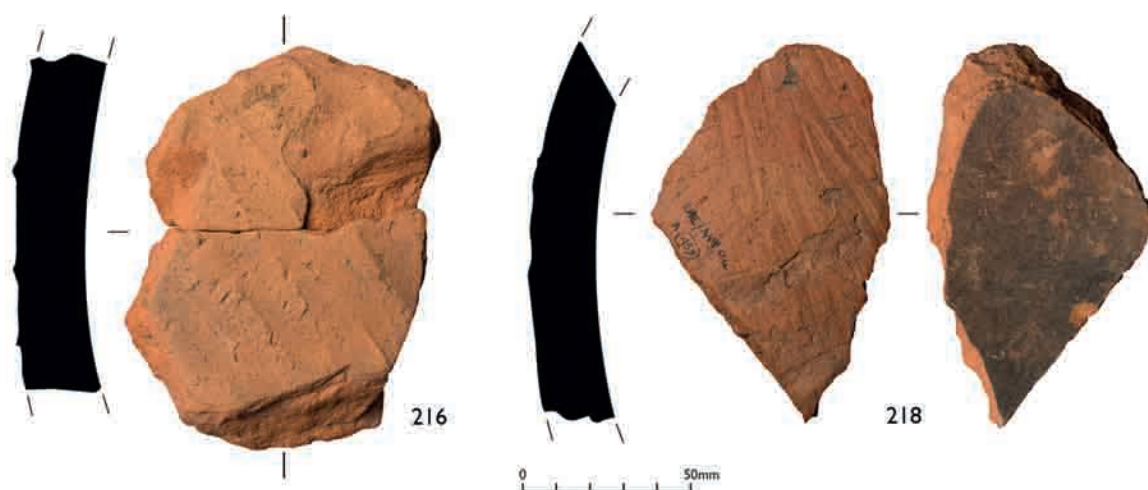


Fig 318 Portable oven fragments, Func Cat nos 216, 218.

Table 74 Phases 10–11b: spatial and chronological distribution of Roman portable oven fragments.

Phases present	Area A			Area B			Area C			Total		
	No	Wt (g)	% wt A	No	Wt (g)	% wt B	No	Wt (g)	% wt C	No	Wt (g)	% wt
10	2	273	17.7	0	0	0	1	42	3.8	3	315	37.0
11a	2	254	16.5	1	75	15.2	0	0	0	3	329	38.6
11b	1	208	13.5	0	0	0	0	0	0	1	208	24.4
Total	5	735	47.6	1	75	15.2	1	42	3.8	7	852	100

**Fig 319** Portable oven fragments, Func Cat nos 221, 222, 231, 236.

- 217 Portable oven; wall fragment with smooth exterior surface; Th: 17 mm. C (3129): Phase 10 fill of pit; SF 9748. Fig 317.
- 218 Portable oven; wall fragment with rough diagonal combing/wiping on exterior surface; sooted interior; Th: 20 mm. A (459): Phase 11a fill of robber trench; SF 9552. Fig 318.
- 219 ?Portable oven; wall fragment with vertical wipe marks on exterior; horizontal wipe marks on interior; exterior surface has solidified drip marks of self-coloured clay (ie roughly finished); Th: 23 mm. A (322): Phase 11a fill of robber trench; SF 9762. Fig 317.
- 220 Portable oven; wall fragment with smooth exterior and faintly ridged interior; partly burnt; Th: 20 mm. B (2458): Phase 11a fill of robber trench; SF 9844. Fig 317.
- 221 Portable oven; wall fragment with smooth exterior surface; finger-prints from luting on interior; Th: 20 mm. A (369): Phase 11b fill of robber trench; SF 9825. Fig 319.
- Post-Roman phases 12–21 (Table 75)*
- 222 ?Portable oven; stepped/flanged base fragment with sanded underside; knife-trimmed at bottom edge of flange; roughly smoothed/wiped interior

Table 75 Phases 12–21: spatial distribution of Roman portable oven fragments.

Area A			Area B			Area C			Total		
No	Wt (g)	% wt A	No	Wt (g)	% wt B	No	Wt (g)	% wt C	No	Wt (g)	% wt
6	796	51.6	4	244	7.8	8	1077	96.2	18	2117	100

Fig 320 Portable oven fragments, Func Cat nos in range 223–38.

and exterior surfaces; Base W: 40 mm; Fl Th: 30 mm; Wall Th: 20–25 mm. Compare the modelled, thickened rim at the base of some ovens from Tell Beydar (Rova 2014, 128 and 134). A (1): Post-Roman; SF 9542. Fig 319.

- 223 Portable oven; incomplete base fragment with edge of knife-cut opening and sanded underside; smoothed exterior surface; interior surface missing; re-used (traces of mortar attached to underside and broken surfaces); Th: >28 mm at base. A (1): Post-Roman; SF 9544. Fig 320.
- 224 Portable oven; wall fragment with smoothed exterior surface, wiped vertically; Th: 20 mm. A (46): Post-Roman; SF 9545. Fig 320.
- 225 Portable oven; wall fragment with smoothed exterior surface, wiped vertically; slightly darkened (sooted?) interior; Th: 20 mm. A (95): Post-Roman; SF 9832. Fig 320.
- 226 Portable oven; wall fragment with smoothed interior and exterior surfaces; Th: 30 mm. A (408): Post-Roman; SF 9765. Fig 320.

- 227 Portable oven; wall fragment with interior surface only (wiped?); re-used - traces of cement mix attached to broken edges; Th: >18 mm. A (766): Post-Roman; SF 10083. Fig 320.
- 228 Portable oven; wall fragment with smooth exterior surface; Th: 39 mm. B (2233): Post-Roman; SF 8378. Fig 320.
- 229 ?Portable oven; wall fragment with smooth exterior surface; Th: 27 mm. B (2233): Post-Roman; SF 9804. Fig 320.
- 230 Portable oven; wall fragment with smoothed interior (with wipe-marks); smoothed exterior with faint, angled wipe-marks; Th: 17 mm. B (2388): Post-Roman; SF 9590 Fig 320.
- 231 ?Portable oven; wall fragment with smoothed interior and wiped exterior (?finger marks); Th: 23 mm. B (2388): Post-Roman; SF 9819. Fig 319.
- 232 Portable oven; wall fragment with diagonal wiping on exterior; interior with multi-directional smoothing/wiping; Th: 23 mm. C (3018): Post-Roman; SF 9578. Fig 320.



Fig 321 Portable oven fragment, Func Cat no 239.

- 233 Portable oven; wall fragment with diagonal finger-wiping on exterior; interior surface missing; possibly from the same oven as SF's 9608 and 9732 from C (3045), although it does not adjoin; Th: >15 mm. C (3045): Post-Roman; SF 8069. Fig 320.
- 234 Portable oven; two adjoining wall fragments with diagonal finger-wiping on exterior and multi-directional smoothing/wiping on interior; Th: 23–5 mm. C (3045): Post-Roman; SF 9608 and SF 9732. Fig 320.
- 235 ?Portable oven; wall fragment with smoothed interior and exterior; Th: 20 mm. C (3059); Post-Roman; SF 9613. Fig 320.
- 236 Portable oven; wall fragment with smoothed exterior and wiped interior; lightly sooted/burnt interior and exterior surfaces; Th: 25–32 mm. C (3067): Post-Roman; SF 9616. Fig 319.
- 237 Portable oven; wall fragment with diagonal finger-wiping on exterior and wiped interior; lightly burnt interior; Th: 24 mm. C (3068): Post-Roman; SF 9617. Fig 320.
- 238 Portable oven; wall fragment with finger-wiping on exterior; interior surface missing; Th: >20mm. C (3068): Post-Roman; SF 9871. Fig 320.
- 239 Thumb-impressed rim. Found unstratified in 1966. It went unrecognised at the time and was published in Thompson as the rim of a large medieval ?storage jar (1976, 216 and 217, fig 41.58) (Fig 321).

Discussion

Fragments of portable ovens have been recovered from a handful of sites in Chester, with the largest and most significant group from the amphitheatre. The recovery of a wall fragment from the fill of a Phase 5 cess pit in Area A suggests that these ovens were in use during the life of Amphitheatre 1a and it therefore follows that they most probably date from the earliest period of production at Holt (c AD 90). That they continued to be produced at Holt until the kilns went out of use is indicated by the presence of a ?waster oven found 'incomplete and cracked in kiln'

(Grimes 1930, 184) which must have been either one of the last objects to have been fired or used as backfill if the kiln was deliberately abandoned. Most of the kilns were daubed up ready for firing when they were abandoned, the exception being the double-flue kiln and the no 2 pottery kiln, both of which were abandoned after firing (Grimes 1930, 32–4).

The wall fragments from Area B Phase 6 may have been discarded following their use in Amphitheatre 1a (Phase 5), to be later incorporated into the seating bank deposits of Amphitheatre 1b, along with old broken pottery, building debris and other rubbish, or they may simply have been incorporated in rubbish deposits from elsewhere. The presence of oven fragments in Phases 10–11b is of note, as much of the material recovered from these phases is thought to derive from the use of the amphitheatre, which was disturbed during later wall robbing and then re-deposited. As a result, it is possible that these oven fragments date to the initial (Phase 5) period of use at the amphitheatre, as also may fragments from other post-Roman contexts. A rim fragment was found at the amphitheatre during Thompson's 1966 excavation, but it was not recognised at the time (Thompson 1976, 217 fig 41.58). A smaller group has also been recovered nearby, from excavations in Grosvenor Park, close to a substantial Roman road aligned to the east entrance of the amphitheatre. It is possible that the ovens from both these sites were used for cooking and heating food to sell to spectators at the arena (Heke 2014, 9).

Another small group was recovered in rubbish deposits during excavations at Delamere Street in 2006, just outside the northern defences of the fortress. Roman activity at the site was relatively short-lived, spanning the late 1st to mid-2nd century. The oven fragments may have originated from the cook-houses of the 2nd-century stone rampart buildings, discovered at the nearby site of Abbey Green in 1975–9 (Heke 2012, 86). It is not uncommon for different ovens to be used concomitantly, eg the first example of a 'portable' oven from Pompeii, formed from a cut *dolium* placed on the ground on a ceramic tile base and set in masonry, was recently excavated in a bakery which had its own purpose-built, fixed, domed ovens (Nicolas Monteix pers comm).

A large rim fragment, found during excavations at 25 Bridge Street in 2001, is the only fragment so far recovered from within the legionary fortress. The oven rim came from a Roman phase, dating either to the early 2nd century or to the AD 160s (Jones 2008b, 169–70 and ill 5.1.5). The site lies within a *scamnum* immediately to the north of the fortress bath-house, where it may have been used to produce hot food for bathers (p 213). The ovens from the amphitheatre and other sites in Chester were made at Holt, the tile and pottery kilns established by the Twentieth Legion, possibly sometime in the later AD 80's (Shotton 1998, 70). They do not seem to have a comparable equivalent in Roman Britain. They were

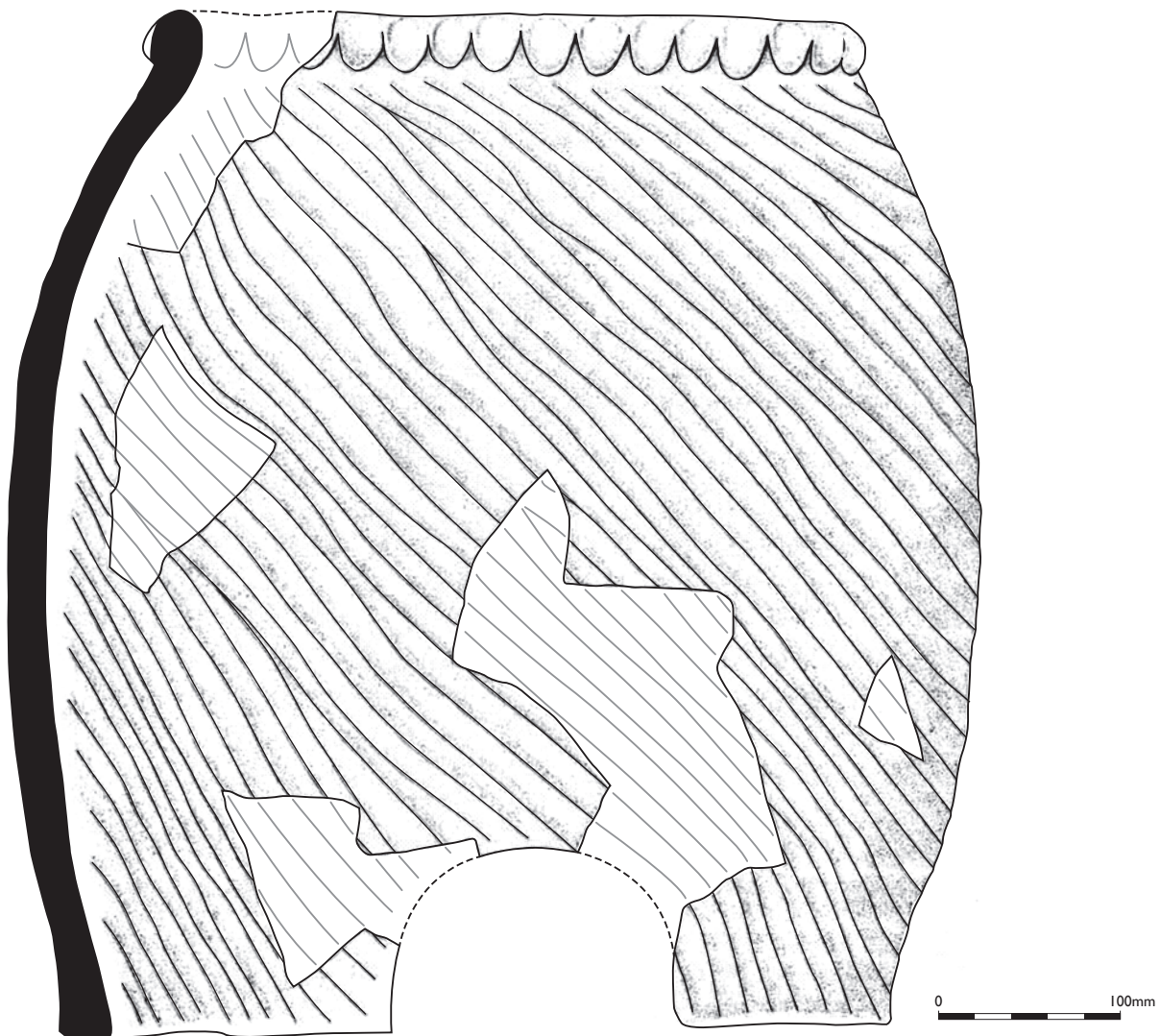


Fig 322 Complete Holt portable oven from Prestatyn (After Blockley 1989c).

made of Holt 'tile' clay and fired in oxidising conditions. Only two near-complete examples have been found, one from Holt (Grimes 1930, 212 fig 60.9), the other from Prestatyn, in North Wales (Blockley 1989c, 164 fig 87; Fig 322). Both ovens are barrel-shaped, lack a base and have a large opening at the top. The Prestatyn oven, in a soft powdery orange fabric with quartz/quartzite filler, has a thick rim with thumb impressions, a semi-circular, knife-cut opening near the base and decoration, in the form of finger-wiping, over the body. There is charcoal staining on the inner surface, *c* 3–8 cm above the base. The oven is *c* 59 cm high, has a base diameter of *c* 48 cm and a top diameter of *c* 40 cm. It was found in a bronze-smith's workshop and so may have served an industrial rather than a culinary function, although there is evidence of cooking on site in some (work)shops at Pompeii, which consists exclusively of portable devices. These comprise terracotta cooking stands (Ital. *fornelli*),

bronze tripods and cauldrons, and pottery vessels used in food preparation (Foss 1994, 129 and 200). The Holt oven is slightly more bell-shaped than the Prestatyn one, with a wider base (diameter *c* 61 cm). It is *c* 55 cm high and has an open top (diameter *c* 38 cm), with a thickened thumb-impressed rim. There is a semi-circular opening at the base, which has a moulded edge decorated with thumb impressions. Although not indicated in the published illustration, photographs of the oven supplied by Peter Webster also show diagonal wipe-marks on the outer surface (P Webster, pers comm). It was found cracked and incomplete in one of the kilns at Holt and the rim is also crudely finished. It is therefore likely to have been a reject. The wall fragments are approximately 2 cm thick. Several fragments from the amphitheatre are blackened internally, presumably through use. Some show finger impressions on the inside where coils, loaves or possibly slabs, of clay have been luted together (Heke 2014, 11).

The fragments of portable ovens found in Chester also include pieces with smooth, plain exterior surfaces as well as those decorated with diagonal lines of finger-wiping. On some of the fragments from the amphitheatre, it is clear that this was done while the clay was still soft; on others, the marks appear to have been made with a tool while the clay was drying. It is possible that the diagonal wiping or marking may have provided extra grip to assist in lifting or moving the oven when not in use. *Tannur* ovens from the 3rd millennium BC site of Tell Beydar, an urban centre in north-eastern Syria, include several examples where the outer surface is partially, or entirely, covered by groups of parallel finger marks. These are generally random in direction and patterning but, in a few cases, they are arranged in successive bands of slanting marks forming a fish-bone pattern. Although clearly intentional, these marks are not thought to be decorative (Rova 2014, 134). They recall both the diagonal finger-wiping on the Holt ovens and also the combed and incised patterning, including bands of chevrons, on similar pieces from the Languedoc area of southern France. It has been suggested that the combed and incised patterns on the outer surface of the Languedoc ovens may have acted as keying for the application of raw clay, to aid the retention of heat in the oven.

There is disagreement and confusion over the appearance, use and terminology of the various forms of portable oven and/or baking cover that were in use during the Roman period. These include the *testum*, the *clibanus* and the two-piece *thermospodium*, although Grocock and Grainger (2006, 81) translate the latter term as ‘hot embers’ and do not believe it to have been a separate piece of equipment. Unfortunately, there are no surviving systematic descriptions of these vessels and the information is both vague and fragmentary. They seem to occur in different shapes and styles and there is disagreement over their identification (Grocock and Grainger 2006, 82). Cubberley *et al* (1988) examined the literary evidence and etymological development of ‘baking covers’ and ‘cooking bells’ in the ancient world and into medieval Europe and determined that *testa* and *clibani* seemed to have more or less interchangeable contexts and meaning. They concluded that the difference between them is minimal and that the terms are synonymous for one particular form of vessel, defined as a cooking bell, shaped like a concave lid, with a wide flange running horizontally all the way around its belly (Banducci 2013, 84 and 173). Banducci argues that Cubberley *et al*’s assumption that the word *kribanos* (the Attic form of the word *klibanos*) in Aristophanes definitely refers to a baking cover and not to a form with some other function (eg a portable heater or incense-burner) is problematic, as their assessment of the literary evidence shows that similar words in ancient texts did not always refer to the same form. Samuel (2002, 34) has also pointed out that, although classical authors provide a wealth of ethnohistorical information, it is of varying reliability and

detail. The archaeological parallels for the written sources are either rare or missing and the accuracy of the historical accounts is therefore difficult to assess.

The literary evidence suggests that the *testum* is a clay baking cover, which was generally used for baking bread and roasting meat. The *clibanus* differs from the *testum* in that it was made either of clay or of metal (especially bronze or iron). Classical authors describe the *clibanus* as having a variety of functions. These varied from baking or roasting meat, baking bread, cooking or offering sacrifices, burning incense and even for the heat treatment of affected limbs. It was also used for keeping food warm. Its exact form is uncertain, although it is described as being rounded in shape, wider at the bottom than at the top and heated by putting a fire underneath. One author states that it could have holes to regulate or lower the temperature. Grocock and Grainger (2006, 82), who also equate the *testum* with the *clibanus*, believe that this refers to the central hole found in some baking covers. However, it could perhaps also refer to the semi-circular vents found at the base of the *tannur*-like ovens from Holt and the bell-shaped ovens from Languedoc. If the description of cooking *sub-testu* (under a cover) includes references to the *clibanus*, as well as the *testum*, the ingredients to be cooked were variously put onto a plate, in a cooking pot (an *olla* or *calix*), in a frying dish (*fretale*), on a *tegula*, on the sides of the vessel or simply on the floor of the hearth (Cubberley *et al* 1988, 100). Putting food on a *tegula* before placing it in a *clibanus* (Apicius viii, ix) perhaps suggests that a cover with a fairly wide diameter would be needed to accommodate the tile, if it was used complete (Flower and Rosenbaum 1980, 205). Similarly, placing food on the sides of the vessel perhaps indicates the baking of flatbread against the inner wall of the oven, which may suggest that the *clibanus* was more akin to a *tannur* oven. Forbes states that the *tannur* is the only form of oven mentioned in the Old Testament and that the so-called *klibanos* of the New Testament was in fact a *tannur* (1966, 64). The two most complete examples of portable ovens produced at Holt are ‘*tannur*-like’ in form, and it is possible that they were used in a similar way (Darling 2012, 350; Precious 2014, 64). However, assigning historical and ethnographic terminology to archaeological ovens and technologies is problematic, as it can blur the line between description and interpretation. The ethnographic evidence used to interpret archaeological ovens can be quite limited, leading to a confused picture of oven technology and use in antiquity. Conflating modern and ancient bread ovens also presents this technology as unchanging and implies that baking practices in the past were similar or identical to those in use today (Ebeling and Rogel 2015, 341 and 346–7). To avoid confusion, Ebeling and Rogel contend that the terminology used for ancient ovens should be descriptive only and linguistically independent of historically- and ethnographically-derived terminology and typology.

The *tannur* is a clay bread oven of cylindrical or slightly

conical shape, open at the top and the base. *Tannurs* are known from the prehistoric, ancient and contemporary Near East and are attested in ethnographic, literary and archaeological sources (Rova 2014, 121; Tkáčová 2013, 3). They occur in different sizes, which range in diameter at the base from c 40/50–80 cm and in height from c 70/80–100 cm. The wall thickness is c 2–3 cm, with rare examples up to 4 cm. The oven is put on the ground rather than attached to it and can sometimes be placed on a circle of stones. It can also be tilted forwards slightly, to facilitate access to the loading hole or ‘mouth’ at the top. It is built up in stages from the base in coils or loaves of clay and has to dry at each stage before more clay can be added and the top finished. The oven is sometimes strengthened by adding extra coils of clay. It is then made wet and smoothed again. A vent hole or ‘eye’ is constructed on the front side of the base to regulate the fuel and the flow of air. The construction and drying process can take several days to complete (Mulder-Hymans 2002, 2 and 16; Tkáčová 2013, 19, 23–4; Mulder-Hymans 2014, 164; Rova 2014, 122–3). It is also sometimes decorated on the rim (Mulder-Hymans 2002, 13).

Tannurs are used primarily for baking either leavened or unleavened bread of flat round shape (Rova 2014, 122). Fuel is introduced from the top and lit. When the walls are hot enough, the flat cakes of bread dough are introduced from the top, after wetting the hand with water or oil to prevent the dough from sticking, and pressed against the inner wall until baked (*ibid*, 124). Since the fire at the base is contained, it uses fuel efficiently and the two sides of the flatbread are cooked simultaneously, through conduction by contact with the wall and by radiation and convection from the fire at the bottom (Symons 2004, 74–5). *Tannurs* are occasionally used for cooking meat, fish, cakes, legumes and rice, although other devices are preferred for food other than bread (Rova 2014, 124–5).

Ancient *tannurs* do not differ significantly from modern examples and the fabric and technique of manufacture seem to be similar too (*ibid*). At Tell Beydar, the inner wall where the bread dough would have been stuck was carefully smoothed and occasionally slightly polished. In a few examples, the outer wall was more carelessly smoothed and sometimes bore a slip, others were covered by groups of parallel finger marks. The base of some ovens had a modelled, thickened rim (*ibid*, 128 and 134). Most of the *tannurs* at the site were set either level with the surface or slightly dug into the ground. The base on which the ovens rested showed much variability and comprised either a bed of small stones; more frequently a layer of pebbles or grit; a thin layer of compacted clay, slightly baked and hardened by heat; or a layer of compacted sherds and brick fragments (*ibid*, 134). Contrary to many modern *tannurs*, all the examples from Tell Beydar appear to have been free-standing, generally adjacent to a wall, although not necessarily tangent to it (*ibid*, 136). The lower part of the oven wall was often found with a layer of pottery sherds,

sometimes packed with clay, probably to provide heat insulation. Large pottery sherds were frequently found amongst the ashes of *tannur* fillings at the site and may have been purposely used for their heat-preserving qualities to keep the fire glowing inside the oven (*ibid*, 129–130 and 132). A large number of grinders and grinding stones were also recovered. Few were found *in situ* and most had either been reused as wall foundations and thresholds or came from filling and slopewash layers (*ibid*, 139). Could the rubbers/ grinders/ smoothers of reused ceramic building material from the amphitheatre possibly have been used in bread-dough preparation?

Portable cooking devices were also common in ancient Greece and Etruria. These included ‘cooking-stands’, terracotta examples of which are also known from Pompeii (Foss 1994, 18–19, 129 and 323 fig 1.10), and so-called ‘barrel-cookers’ (Sparkes 1962, 130; 1965, 163 79a and plate 30.4) or ‘barrel-stands’ (Scheffer 2014, 175), which are reminiscent of the *tannur* ovens of the Near East. The Greek barrel-cooker could be used both as a stand, which held a large round-bottomed vessel, such as the *chytra*, above a fire lit on the ground, or as an oven, used for baking flatbreads on the heated interior. Actual examples of these portable clay ovens are known from the Athenian Agora (Neils 2004, 58), including one which is 37.5 cm high (Paulas 2016, 577). They are also represented in several terracotta figurines from the Athenian colony of the Thracian Chersonese, Cyprus and Sicily, which show cakes of dough attached to the upper inside walls of the oven (*ibid*), and also on two fragmentary red-figured cups, the latter dating to the 5th century BC. Both the figurines and the red-figured cups depict women preparing the dough and baking the bread. One cup, dated c 460–450 BC, shows women around a barrel cooker, one of whom is most likely preparing to remove breads from the walls of the oven to place in a basket held by another woman (Tsoukala 2009, 389 and 395 fig 13; Neils 2004, 57 fig 4.4 and 58). The other cup, dated c 470 BC, depicts a woman either placing or removing flatbreads from the oven. As the fire is clearly lit at the bottom of the oven, the former is perhaps more likely Tsoukala 2009, 389 and 395 fig 11; Neils 2004, 58). The barrel-stand, the Etruscan variant of the Greek barrel-cooker, dating from the 7th to 6th centuries BC, seems more likely to have been used only as a support for a cooking pot, as it has a narrower opening on the top (Paulas 2016, 578). There are two variants, which range in height from 26–40 cm, but which have a top diameter of only 15 cm (Banducci 2015, 158).

So far, none of the portable ovens made at Holt have been found *in situ*. However, archaeological evidence from other sites in Britain and Europe suggests that they were placed on the ground during use. For example, the Languedoc area of France has produced similar ovens, in the form of a removable ceramic dome, independent of the clay hearth base on which it was placed. Although few of these ovens have been recovered from primary contexts,

there are the remains of a circular hearth at *Ambrussum*, ringed by fragments of at least two different portable ovens (Luley 2014, 46). Another was found at Nîmes, crushed in place in the angle of an open (?public) space, near to a possible *macellum*; and another example, from La Capelière, was found crushed close to a circular hearth with a clay base (Barberan *et al* 2006, 269).

The Languedoc ovens appear to be a local adaptation from the fixed, domed Iron Age bread-ovens of the native *oppida*, which were comparable in form to the *tannur* oven, a cooking device very common in the Mediterranean world, from prehistory to the present day. The adaptation from a fixed to a portable oven meant that the structure no longer needed to be rebuilt periodically and enabled the space devoted to the preparation of food to be rearranged, at least in a domestic setting (*ibid*, 257 and 270). The ovens are bell-shaped, with a semi-spherical profile, sometimes slightly S-shaped. The incurved rim has a flat top which is occasionally (rarely) grooved and also sometimes stamped with the name of either the manufacturer or the owner of the workshop at which the oven was made. There are three or more bands of beading below the rim and rows of incised notched decoration below the beading. This decoration sometimes also extends to the body and base. There are three or four semi-circular vents at the base, the widths of which vary from 7.5–10 cm, and a circular opening at the top. The diameter of the opening ranges from 32–62 cm, the height from 38–66 cm, and the internal diameter of the base from 54–86 cm. The wall thickness ranges from 1.5–3.5 cm. Based on their relative dimensions, there appear to be at least two types of oven, the larger of which may have been produced commercially for ‘industrial-scale’ use, the smaller of which was probably intended for domestic use. The inner walls are often combed, probably to aid the adherence of the bread dough. Several oven fragments from Worcester also have finger-wiping on the inner surface, although this differs from the smooth interior of many ancient and modern *tannurs* and also of the ovens from Holt (*see below*). The outer walls are systematically combed and decorated with incised patterns of chevrons and oblique or horizontal lines arranged in groups, which are distributed in horizontal bands on the shoulder and base, or arranged in zigzags or randomly on the body. Some examples have irregular stabbed decoration on the flat upper part of the rim. The combed patterns on the exterior may have acted as keying for a coating of raw clay, designed to optimise the storage of heat in the oven (*ibid*, 267–8).

The use of these ovens is limited both geographically and chronologically. They were produced and distributed within the low Rhodian triangle, with an epicentre in the departments of Gard and Hérault. They are attested from the third quarter of the 1st century BC and all throughout the 1st century AD, with an apogee in the first half of the 1st century AD. Most occur in a sandy fabric identical to that of the Gaulish *amphorae* produced in the Gard. They have the same date range as these Gauloise 1 *amphorae*

and also sometimes bear stamps. Their earliest production and distribution appears to have been in the Gard and they may have been produced by the same workshops that also made and exported these *amphorae*. The same basic form then appeared later in other fabrics – presumably at different centres of production – notably at Hérault. This second group occurs in a coarser ‘local’ *dolium* fabric and these ovens may well have been produced alongside *dolia* at specialist workshops. Their distribution attests to the presence of two different culinary traditions. During the Roman period, the Hérault Valley continued to be a border between two different methods of baking bread. In western Languedoc, bread was cooked in *patinae* (flat-bottomed, circular or oval dishes with low walls); in eastern Languedoc and in Provence, it was baked in portable ovens (*ibid*, 268–9).

Although portable ceramic ovens are rare in Roman Britain and not well understood (Darling 2012), recent discoveries in Worcester (Hughes 2008; Sworn 2009; Crawford 2014; Evans 2014) and elsewhere have provided further evidence for their presence and possible function. Beehive-shaped ovens, made in a coarse Malvernian fabric, have been recovered from sites in Worcestershire and north Gloucestershire. They are usually associated with 3rd to 4th-century deposits but appear to have been in use from the late 2nd century onwards (Crawford 2014, 97 and 100). Recent excavations at the Hive, Worcester, produced a large assemblage of oven material, in the form of pre-formed ovens or smokers and baking plates, as well as *in situ* evidence of their use, in the form of a circular base bedded into the clay floor of an aisled building. This suggests that, although pre-formed elsewhere, the ovens were no longer portable once placed in position. The excavations revealed intensive occupation along the southern side of an east–west aligned street, comprising 2nd-century strip buildings, and a later (3rd–4th century) aisled building (Sworn *et al* 2014, 15–17). A significant group of oven material was also recovered from excavations at the nearby City Campus site. Most came from Period 6 (late 3rd to 4th century) but a number of fragments were recovered from late 2nd- to late 3rd-century contexts. Excavations at the City Campus, which lay to the north of the east–west street identified at the Hive, identified agricultural buildings, gravel quarrying and rubbish dumping, dating between the late 2nd and late 3rd centuries. The sites which have produced this material are all industrial in nature, apart from the City Campus, although the oven material recovered here may well have originated from the adjacent area at the Hive, which produced a very large assemblage of oven material (*ibid*, 2014, 145). The Worcester ovens are hand-made and slab-built. They have a chimney/vent at the top, 15–20 cm in diameter, a flat base, 52–60 cm in diameter, internal ledges with perforations through the wall at either end (perhaps for supporting a grill) and a large, U-shaped mouth (height: 32 cm) with straight sides, a curved top and a heavy rim formed over a ‘sausage’ of clay. Most base fragments have heavy

finger-wiping. Wall fragments (Th: 13–22 mm) are either smooth, have external or internal finger-wiping (the latter is more common) or have finger-wiping on both surfaces. Some have been found with circular perforations of varying size (Diam: 8–30 mm), which may have been used to control air-flow and internal temperature or for supporting rods, used for smoking or dry-curing meat or fish (Crawford 2014, 99). Smoke fuming and sooting has been found on a small number of fragments, especially around the base, both internally and externally (Evans 2014, 6–9). Large ovoid ‘baking-plates’ were found associated with the ovens at both the Hive and the City Campus, although they are too big to have fitted inside. They range in thickness from 13–22 mm, have sanded undersides and a range of upper surface finishes, including finger-wiping (Crawford 2014, 99). Similar plates are known from sites in Warwickshire, Oxfordshire and Cambridgeshire, although none have been recorded from Chester.

A large, hand-made vessel in a tile-like fabric from Lincoln, with a thumbled cordon immediately below a plain rim, is said to resemble the oven recovered from Holt (Grimes 1930, 212 fig 60.9), although it appears to be smaller in size, with a rim diameter of *c* 26 cm and a wall thickness of *c* 1.5 cm. The Lincoln tile fabric occurred in very small quantities in the 2nd century but was most common in the mid–late 3rd and early 4th centuries. The largest group of fragments came from strip buildings with hearths and oven bases, suggesting an association with large-scale food preparation (Precious 2014, 64 and 71).

Mark Lewis has recently identified the ‘jar’ rim from the fortress baths at Caerleon, published in Zienkiewicz 1986b, 82, group 25:17 and 83, fig 31.17, as a probable oven fragment. It is in a soft buff fabric with an orange-red outer surface, hand-made and poorly finished, with the remains of a brown ‘slurry’ on the interior. It fits well within the local tile fabric series and is crudely executed. Finger-smoothing marks are visible, especially on the interior. It may actually be a rim fragment from an arched vent at the base, rather than from the top opening. It was recovered from the middle layers of the rubbish filling the large *piscina* at the south-western end of the *frigidarium*. The group as a whole belongs to Phase X and dates to the earlier 4th century (Mark Lewis pers comm). It is another interesting example of the association of such devices with fortress *thermae* and bath-houses generally.

Although portable ovens of similar form were produced in the Languedoc region of southern France from the late 1st century BC and at Holt in north Wales, from the late 1st century AD, the cultural and technological influences behind their development appear to have been quite different. The Languedoc ovens appear to be an adaptation from the local Iron Age ovens of the native *oppida*. The Holt ovens, however, may have been influenced by the presence there of potters who are thought to have originated in the eastern Roman world, including Greece, Thrace and Asia Minor (Greene 1977, 124 and 126; Darling 2012, 351).

It is possible that some of the oven fragments from the amphitheatre may have originated from the fortress baths, as a large rim fragment was recovered from a *scamnum* just to the north of the *thermae* from a 2nd-century deposit at 25 Bridge Street in 2001 (Jones 2008b, 169–70 and Ill 5.1.5), but the relatively large group recovered from the site suggests that they are more likely to have originated there and were probably derived from ancillary structures or activities associated with the amphitheatre itself, such as food stalls located around the periphery of the building or along the roadways leading to the site, eager to attract the business of spectators before they reached their main destination.

Miscellaneous

This category incorporates those finds that cannot be assigned to any particular function.

Occasional fragments of broken iron strap and strip were noted in the assemblage, some of the pieces of strap had central nail holes present suggesting they were broken from hinge straps or large box bindings. A small number of broken iron ‘figure-of-eight’ links from chains that could have been put to a number of uses were recovered from deposits A (625, 1077, 1152) associated with the use of Amphitheatre 1a, *c* AD 70–80s (Phase 5) and Amphitheatre 1b seating bank deposits B (2513) and B (2543) *c* AD 100 (Phase 6).

- 240 ?Strap end/binding. Folded strip of copper alloy with a rivet hole; L 11 mm, W 12 mm. B (2494): Phase 11a fill of robber trench, SF 8470.
- 241 Sheet. Layer of copper alloy adhering to a lump of ?mortar/soil and charcoal. XRF analysis shows one side of sheet has corrosion products indicative of lead; 54 mm × 50 mm. A (625): Phase 5 widespread clay layer; SF 8577.
- 242 Sheet. Copper alloy rolled into a cylinder, squashed and misshapen; L 35 mm, diam 10–13 mm, th < 1mm. A (1100): Phase 5 cess pit fill of A (1078); SF 8718.
- 243 Tapered folded sheet of copper alloy in two (joining) pieces; heavily corroded; tip broken; L 105 mm W 5–22 mm? A (126): Phase 7 fill of pit A (125), SF 7193.
- 244 Sheet? Fragment of copper alloy from what may have originally been a triangular pendant. Suspension loop folded over. Some mineral preserved organic material; L 26 mm, w 21 mm (max), th < 1 mm. B (2611): Phase 10 seating bank deposit; SF 8828 (i).
- 245 Domed ring of copper alloy with central circular perforation; possible stud; diam 5 mm, diam of hole 1.5 mm. A (1126) Sa <4752>: Phase 3 trample; SF 9731.
- 246 Small copper-alloy ring with protrusion, over

- which is a small triangular plate of copper alloy, now bent, with beaded decoration around the edges and groups of three interlinked circles at each point of the triangle; diam 6 mm, internal diam 4 mm. B (2612) Sa <4381>: Phase 6 seating bank; SF 9227.
- 247 Ring. Copper alloy. Fragment only; oval in section; external surface ribbed (four grooves); internal surface plain; int diam *c* 23 mm, ext diam *c* 30 mm, th 3 mm. A (899): Phase 7 sealing layer of road edge, SF 8579.
- 248 Ring. Complete copper-alloy ring with faceted surfaces; ext diam 22 mm, int diam 17 mm. B (2456): Phase 11b: SF 8353.
- 249 Ring. Plain band of copper alloy except for two parallel grooves all the way round; ext diam 22 mm, int diam 15 mm, W 4 mm. A (218): Post Roman; SF 7259. *Cf* similar example from Ribchester (Howard-Davis 2000, 25, fig 61, no 104). Assumed to be Roman on the basis of associated finds.
- 250 Ring; lead, complete but bent and squashed; W of band 9–19 mm, th 2–3 mm; diam 70 mm; B (2513) Sa <4382>: Phase 6 seating bank deposit; SF 10005.
- 251 Block of lead; roughly cuboid but flattened and splayed at (broken) end; L 33 mm, W 5–12 mm, th 3–5 mm; A (1082) Sa <4728>: Phase 3 black sand layer; SF 10001.
- 252 Block of lead; cuboid L 32 mm, W 15 mm, th 4 mm with an indentation measuring 15 mm × 2 mm on one side; A (625) Sa <4164>: Phase 5 widespread clay layer; SF 10007.
- 253 Disc; almost complete circular piece of lead with central perforation; diam 57 mm, th 5–7 mm, diam *c* 8 mm; A (1100): Phase 5 fill of cess pit (1078); SF 8717.
- 254 Disc; circular piece of lead; ?weight; diam 28 mm, th *c* 3 mm, 27 g. A (625) Sa <4710>: Phase 5 widespread clay layer; SF 9996.
- 255 ?Disc; half of a ?perforated lead disc; diam 38 mm, th *c* 5 mm, 24 g; B (2498) Sa <4367>: Phase 6 seating bank; SF 9321.
- 256 ?Disc; circular piece of lead; diam 12 mm, th 3 mm; B (2498) Sa <4380>; Phase 6 seating bank; SF 10003.
- 257 Disc; half of a lead disc; diam 20 mm, th 1 mm; B (2543) Sa <4315>: Phase 6 seating bank; SF 10006.
- 258 Disc. Small fragment of a polished bone disc. Flat surfaces with a finished curved edge; diam *c* 17 mm, extant L 10 mm, th 1.5 mm; A (1216) Sa <4784>: Phase 5 fill of pit (1256); SF 9869.
- 259 Rod. Square-sectioned, copper alloy, split at one end with one arm continuing in a straight curve and the other branching off at almost a right angle; L 48 mm (incomplete), section 3 × 3 mm. A (336): Post-Roman; SF 7381. *Cf* Lentowicz 2002, 77 fig 267 no 331.
- 260 Rods of lead; five pieces but may be the result of recent breaks, one piece bent into a right angle; L 62 mm, 54 mm, 52 mm, 43 mm and 41 mm; A (1216): Phase 5 fill of pit A (1256); SF 10002. Also three from Sa <4784> L 34 mm, 33 mm and 29 mm.
- 261 Tube formed from rolled up piece of lead sheet. ?Weight; L 17 mm, diam of holes 3–4 mm, W *c* 7 mm, 4 g; B (2513) Sa <4382>: Phase 6 seating bank deposit; SF 10004.
- 262 ?Plug or cap of lead. Flat irregular-shaped piece, below which is an incomplete circular lead ?plug; 45 mm × 40 mm × 3 mm; A (601): Phase 8 fill of construction trench; SF 10000.
- 263 Strips. Two fragments of copper alloy – one roughly triangular and one rectangular with two cut edges, the other two damaged. Two rivets *in situ* in the rectangular piece 10 mm from the edge, rivets 7 mm apart; 17 mm × 12 mm and 39 mm (including one end folded over) × 19 mm (max): A (738). Phase 7 shrine collapsed deposits; SF 7531.
- 264 Strip. Copper alloy, folded and with perforated ends. Some mineral preserved organics in places; L (folded) 20 mm, W 9 mm (max at terminal). B (2611): Phase 10 seating bank; SF 8828 (ii).
- 265 Unident – roughly circular ?hollow piece of copper alloy with solid ‘neck’. Adjacent side broken off; L 20 mm, W 18 mm. B (2498): Phase 6 seating bank; SF 8839.

Addendum

During post-excavation work on the post Roman assemblages, after all numbering had been carried out for this volume, this object was identified as of probable Roman date:

- 266 Small fragment of a lead ?tag with relief decoration on one side and graffiti on the other. Roger Tomlin comments that ‘the objects in high relief, especially the one in the apex, look like *torques*, the torcs awarded as military decorations, depicted on legionary tombstones. The ‘graffiti’ does not appear to represent any letters, but the rake-like figure looks like the ‘trident’ sometimes scratched on pottery as a mark of identification, except that

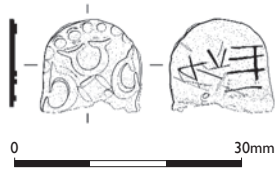


Fig 323 Addendum: lead tag, Func Cat no 266.

it has four teeth instead of three. The trident is typically a gladiator's weapon (of the *retiarius*). It appears also that gladiators used a four-pronged weapon. Evidence for this was found on the

femur of a burial from the gladiator's cemetery at Ephesus (Kanz and Grossschmidt 2009, 218). The 'K'-like figure just above two of the prongs is similar to the 'supine kappa' that occurs as a *character* on magical inscriptions'.

The date of this fragment is problematical – the design in relief could equally be of late medieval/early post-medieval date. The piece derives from a post-medieval phase containing residual Roman and medieval material, though it does not appear to have been subjected to much wear. L 12 mm, W 12 mm, Th 1mm. C (3021): Phase 16 cultivation deposit; SF 8008. Fig 323.

ROMAN BUILDING MATERIALS

By Alison Heke

Introduction

A large quantity of Roman building material was recovered from the amphitheatre site, although paradoxically very little of it could be identified as deriving from the successive amphitheatre structures. There is therefore little potential for this material to supply information on the structure of the buildings themselves. Some of the building material may relate to the structures recorded outside the walls of Amphitheatre 1, but most of it appears in dump deposits, especially those around the north and west sides of Amphitheatre 1a at the end of Phase 5, and the imported dumped material used to create the seating banks for Amphitheatre 1b in Phase 6.

The importance of the building material lies in the fact that much of it derives from the well dated Flavian-Trajanic deposits of Phases 5–6, and therefore gives an excellent set of benchmark data showing the range of building material which was in use, and which was actually discarded in the first three decades of the occupation of the fortress and *canabae* of Chester.

The material has been fully and extensively quantified and studied, and is the largest assemblage of Roman building material yet studied in depth from Chester. The full analyses are presented supplemental to this volume as a Historic England Research Department Report which is available on-line and as a print-on-demand document (Heke 2017).

Ceramic building material (CBM)

Quantity

The site produced a total assemblage of 24,184 fragments of Roman ceramic building material weighing 491,004 g, with an average fragment weight of 20.3 g. Of this, deposits of Phases 4–11b (comprising contexts relating to the construction, use and final robbing of the amphitheatres) yielded 9,677 fragments weighing 89,843 g. For these phases Area A produced 56.6 % by count and 60.5 % by weight of the material from Roman phases, while Area B produced the rest.

The Flavian-Trajanic stratified deposits of Phases 5 and 6 combined yielded 72.3 % by fragment count and 59.2 % by weight of the CBM assemblage from Phases 4–11b.

Methodology

The ceramic building material was analysed in terms of quantity, range and variety, condition, provenance and date-range. It was recorded to the level set out in 2.6 of the Archaeological Ceramic Building Materials Group (ACBMG) minimum standards draft document for the recovery, curation, analysis and publication of ceramic building material (Hunter-Mann 2001), with the addition of ‘part’ (eg middle, edge, end, corner, etc) as a sub-term of ‘form’. Fragments were identified macroscopically, except for unusual fabrics and surface features, which were examined microscopically at $\times 20$ magnification. The assemblage was quantified by fragment count and weight (in grammes) and measurements (in mm) were taken of any complete dimensions. Rubbings were made of all stamps, signatures and other markings. Small find numbers were assigned to stamps, signatures, specific markings and atypical or unusual features and forms. Where possible, *tegulae* lower cutaways were identified and assigned to dated groups after Warry (2006a, 401, although see also *Provenance and date range* below). Stamps were identified and numbered according to the Chester tile-stamp series; RIB numbers were also allocated where applicable (RIB II.4). The figures for the portable ovens (pp 343–353) are included here for the sake of completeness, as these devices were made from the usual Holt ‘tile’ fabric.

Range and variety

A wide range of forms was recovered from the site as a whole, although roof tiles and indeterminate fragments predominate. Forms within the total assemblage by Area are quantified in Table 76. As shown in the table, *tegulae* form the largest identifiable component by weight (32.5 %) of the assemblage followed by bricks (22.6 %) and *imbrices* (14.9 %). The remaining forms together comprise just 3.6 % by weight of the total. They consist of small, but significant amounts of box-flue tiles (*tubuli*), half-box tiles (*tegula hamata*) and facing tile (*parietalis*) (2.0 % by weight) as well as portable oven fragments (0.7 %), herringbone-floor (*opus spicatum*) bricks (0.4 %) and antefixes (0.1 %). In addition, small, but significant amounts were recovered of finial/chimney fragments (0.1 %) and vaulting tubes (*tubi fittili*) (0.03 %). Three discs/stoppers were also recovered (0.02 % by weight). The percentage of indeterminate forms is skewed by the number of small fragments recovered from sample residues. This is illustrated by the large number of indeterminate fragments (90 % by count) which form far less by weight (26.4 %) of the total assemblage.

Table 76 Total CBM assemblage; range of forms by Area.

Form	Area A		Area B		Area C		u/s		Total			
	No	Wt (g)	No	Wt (g)	No	Wt (g)	No	Wt (g)	No	% no	Wt (g)	% wt
Antefix	4	254	2	73	0	0	0	0	6	0.02	327	0.1
<i>Imbrex</i>	384	35,144	305	22,835	191	15,211	0	0	880	3.6	73,190	14.9
<i>Tegula</i>	489	74,230	404	55,581	186	28,875	2	851	1,081	4.5	159,537	32.5
Vaulting tube (<i>tubi fittili</i>)	3	36	4	82	3	36	0	0	10	0.04	154	0.03
Solid voussoir (<i>cuneatus</i>)	3	1,718	0	0	1	113	0	0	4	0.02	1,831	0.4
Box tile (<i>tubulus</i>)	39	4,146	20	1,181	19	1,834	0	0	78	0.3	7,161	1.5
Half-box tile (<i>tegula hamata</i>)	2	186	2	567	0	0	0	0	4	0.02	753	0.2
Facing tile (<i>parietalis</i>)	0	0	3	1,361	0	0	0	0	3	0.01	1,361	0.3
Brick	138	73,809	112	25,115	43	12,200	0	0	293	1.2	111,124	22.6
Herringbone- floor (<i>opus spicatum</i>) brick	5	1,102	5	876	2	155	0	0	12	0.05	2,133	0.4
Finial/Chimney	1	30	3	173	1	122	0	0	5	0.02	325	0.1
Disc/Stopper	1	33	2	41	0	0	0	0	3	0.01	74	0.02
Portable oven	12	1,543	9	552	9	1,119	0	0	30	0.1	3,214	0.7
Indeterminate	8,266	51,792	7,009	48,585	6,461	28,877	39	566	21,775	90	129,820	26.4
Total	9,347	244,023	7880	157,022	6,916	88,542	41	1,417	24,184	99.89	491,004	100.15
%	38.6	49.7	32.6	32	28.6	18	0.2	0.3	100		100	

The presence of bricks in a range of thicknesses implies a range of forms. The range of thicknesses indicates that most are probably fragments of either *bessales*, *pedales* or *tegulae bipedales*, the three forms most commonly used in hypocaust construction. The small square *bessalis* was used to form brick-stack *pilae*, the larger square *pedalis* was generally used as a capping brick for such *pilae*, and the *tegulae bipedalis*, the largest of the square bricks, was used to bridge the gaps between *pilae*. Some fragments may have come from the *sesquipedalis*, a large square brick which was also used for flooring, or from the *lydion*, a large rectangular brick, similar in size to the *tegulae*, which was commonly used for levelling or binding courses in walls (Brodribb 1987, 34–43). The bricks also include a handful of *cuneati* (solid voussoirs), wedge-shaped bricks which were used in the construction of arches. There is no evidence that bricks were used in the construction of the amphitheatre at Chester, as they were at Caerleon (Wheeler and Wheeler 1928, pl xxvii–xxix) and in London, where *lydion* bricks were used in horizontal tile courses in the masonry walls of the amphitheatre (Betts 2008, 165; Bateman *et al* 2008, figs 44, 57)).

A small number of *tegulae* have a sanded stepdown band, a feature of military production, which occurs on approximately 57 % of Chester/Holt/Tarbock *tegulae*, but which is not part of the process for forming the upper

cutaway, as has sometimes been suggested (Warry 2006, 14). Examples occur residually, and none can be related to any of the Warry *tegula* groups.

A small number of tiles bear traces of coloured slip, generally on their upper surfaces, sometimes including the top and inner edges of *tegula* flanges and, more rarely, on their undersides. This is sometimes red but 85 % of examples are cream in colour. Forms treated in this way include roof tiles – *tegulae*, *imbrices* and antefixes – and bricks. More *imbrices* (53.5 %) are decorated in this way than any other form. Swan (2008, 68) has noted that the contrasting colours thus produced would have been most effective on structures with extensive roof spans and so may have been reserved for large, probably public, buildings such as *thermae*. Warry has also noted that tiles coloured in this way seem to be mainly associated with later sites (2006, 17). The Roman phases produced tiles decorated exclusively with cream slip, while red slip occurred only in residual material from Phases 10–21.

Markings occur on 0.7 % of fragments. These comprise 153 signatures, nine legionary stamps, five impressions and four inscriptions.

Using probability theory, Warry has estimated that for every 1,000 fragments of roof tile recovered, there is a 40 % chance of finding one or more stamps and a 60 % chance of finding none. For example, at Prestatyn, 10 stamped

tegulae were recovered from 2,531 fragments of roof tile (39.5 %) (Warry 2010, 144). The amphitheatre assemblage largely conforms to this theory, although legionary stamps were found on brick and indeterminate fragments as well as on *tegulae*. Nine were recovered from 2,254 fragments of roof tile and brick (39.9 %). If identifiable roof tile alone is considered (1,961 fragments), the figure rises to 45.9 %, although it should be noted that this figure excludes a number of indeterminate fragments which are also likely to be roof tile.

Of the nine stamps, only two are datable. Both are known to occur only on group A/B *tegulae* and are therefore *c* AD 90/100–140 AD in date. They comprise a partial Holt 7 stamp (Cat no 23), and a partial Chester 83 stamp (Cat no 18).

A possible textile impression on an indeterminate fragment, SF 9618, was recovered from a post-Roman context (Cat no 27). This piece, possibly an *imbrex*, also bears a single curved signature. A second textile impression (Cat No 16) appeared on the plain unsanded surface of a scored box tile or facing tile. These are perhaps the impressions of the tile-makers' clothing or of cloths used during production, and were presumably left accidentally. The corner of a *tegula* with the impression of a round-sectioned object (Diam: 5 mm) in the top rear of the flange, was recovered from a post-Roman context in Area A. There are also two tiles with hobnail impressions, comprising an indeterminate fragment (Cat no 21) and an *imbrex* (Cat no 25). The latter piece also bears a signature across the top of the gable. Warry has noted that approximately 10 % of military *tegulae* have boot marks (they are rare on civilian tiles), which were probably made by the officer in charge of the kilns testing the hardness of the tiles prior to firing (2006a, 16).

Four antefixes with partial moulded inscriptions were recovered, three from Area A and one from Area B. Two were recovered from Phase 7 contexts in Area A; a probable Holt type 2 form with partial surviving letters 'E' and 'G' and traces of white slip on the upper surface (Cat no 4), and a probable Holt type 1 form (Cat no 3) bearing part of a *phalera* and spear. The third example from Area A, from a residual context, is from either a Holt type 1 2 and bears the partial inscription 'GX' (Cat no 5). The antefix from Area B is also either a Holt type 1 or 2 and bears the surviving battered fragment of a boar's head and the partial inscription of the inner lower stem of the final letter 'X' (Cat no 12).

Of the 153 signatures recorded, the majority are on *tegulae* (× 63) with 33 on *imbrices*, nine on bricks and 48 on indeterminate forms, most of which are likely to be fragments of *tegulae*. These figures correspond with the frequency of occurrences noted by Brodribb (1987, 99–105), in that signatures were found to be most common on *tegulae*, relatively common on *imbrices* and less frequent on bricks. The majority of signatures on *tegulae*, bricks and indeterminate forms are curved marks made with one (×

29) or more fingers, generally two (× 23) but sometimes three (× 4) or more rarely four (× 1) fingers. Semi-circular signatures account for approximately 60 % of all signatures found on *tegulae*, with a slightly wider range of signature types on roof tiles produced by the military (Warry 2006, 15). Straight signatures are also fairly common: 15 were made with a single finger and three with two fingers. There are fewer examples of looped signatures (× 4 single looped; × 1 triple looped) and only one S-shaped mark, made with two fingers. There are 12 examples of more unusual multiple, over-lapping signatures, generally made with a combination of curved and straight finger marks. There is also a group of signatures (× 27) that are so fragmentary it is unclear what form they take. The signatures on *imbrices* comprise 18 parallel to an edge with 14 across the top of the gable. One unusual signature may have been made with a stick or three-toothed comb.

Provenance and date range

Fifty-four *tegulae* with datable lower cutaways (× 52) or datable legionary stamps (× 2) were recovered from the site. The earliest, Group A, are thought to have been produced between *c* AD 40–120 (with production at Holt from *c* AD 90/100–120). Group B *tegulae* have a broad period of production from *c* AD 100–180 but are thought to date at Chester to between *c* AD 120–140. Chester was supplied at this period from kiln sites at Tarbock, Merseyside, which had a short period of production in the mid AD 120s, and at Holt, towards the end of the Group B production period, between *c* AD 130–40 (Warry 2006, 156 and 158). Group C *tegulae* date from *c* AD 160–260 and group D *tegulae* to *c* AD 240–380 (Warry 2006, 63).

All three trenches produced a similar spatial and chronological pattern, with a higher number of Group A and B *tegulae* than Groups C or D. There are noticeably fewer Group C *tegulae* than any other type. In fact, only one definite group C form was recovered, from Area A. The dating of this type, between *c* AD 160–260, in part coincides with a period of abandonment and dereliction at Chester, when a large part of the legion was absent for long periods (p 6). Could the presence of Group D *tegulae* at Chester relate to the extensive programme of rebuilding that began at this time and which continued to occupy the first quarter of the 3rd century? If so, Group D *tegulae* may have begun to appear a couple of decades earlier in Chester than they did elsewhere, ie from the AD 220s, rather than from *c* AD 240 onwards. If so, they would represent the earliest examples of this type in Britain (P Warry pers comm).

Other datable forms comprise flue tiles and vaulting tubes. The vaulting tubes (*tubi fittili*) are of note as, apart from stray examples, these forms are known only from the fortress baths in Chester, where they are thought to date to the reconstruction of the vaulting over the bathing halls during a major refurbishment in the second quarter of the 3rd century, although they could be earlier in date. None

of the *tubi fittili* fragments were recovered from Roman phases (see Tables 76–78), which perhaps supports the early 3rd century date for their use at the fortress baths. If this is indeed the case, they presumably represent building debris from a post-Severan phase of activity at the amphitheatre. It is probable that some of the other ceramic building material from the site comprises debris from various phases of refurbishment of the fortress baths.

The flue tiles include rare examples of half-box tiles (*tegulae hamatae*) and facing tiles (*parietales*). Both these forms were in decline by the late 1st century and had been largely replaced by box tiles (*tubuli*) in the early 2nd century (Black 1996, 62; McComish 2012, 152). Both knife-scored and combed box tiles are present. The former are thought to have been generally replaced by the latter by the early 2nd century AD (Black 1996, 64; Betts 2000, 3; Ward 1999, 48). Combing was more efficient than scoring, as it provided a much better grip for keying (Brodribb, 1987, 109). Although small in number, the presence of box tiles, facing tiles and half-box tiles is notable, as these forms must have originated from hypocausts or bath-houses. Three of the box tiles are thin-walled forms. In London and south-east England, these thin-walled, knife-scored, box tiles pre-date the early 2nd century AD (Black 1996, 60; Pringle 2006, 128). The thin-walled forms from the amphitheatre were all recovered from post-Roman contexts. Thin-walled box tiles are often found in association with facing tiles and half-box tiles. Black also notes that hypocausts used to heat domestic rooms are extremely rare before *c* AD 150 and therefore that the vast majority of box tiles made before the mid-2nd century are more likely to have come from bath buildings (*ibid*, 64). It is therefore possible that this small group of early flue tiles are either from the original Flavian phase of the fortress *thermae* or from an early extra-mural baths somewhere in the vicinity of the amphitheatre, possibly even associated with it, as at Caerleon (Wheeler & Wheeler 1928, 144 and plate XX; Evans 2000, 495). Excavations at the Groves in 1989 revealed a possible small bath-house to the south of the amphitheatre, just above the river (Carrington 2012a, 309).

Roman phases produced eight datable *tegulae* (14.8 % of the total number recovered), with five from Area A. These comprise two Group A's, one Group C and two Group Ds. The Group A's were recovered from Phases 5 and 8, the C from Phase 9 and the Ds from Phase 7. Area B produced just three datable *tegulae*; comprising one Group D and two Group As. The Group C *tegula* from Phase 9 provides a *terminus post quem* of *c* AD 160–260 for the use of the second amphitheatre. Although it should be noted that Warry's dated groups have been questioned by Betts on the basis of material excavated from London and south-east England (McComish 2012, 216). The presence of three Group D *tegulae* in Phases 6 and 7 could be taken to support the view that all of Warry's cutaway types were present from the outset of Roman occupation in Britain (*ibid*, 216). The two examples from Phase 7, however, were

found alongside other intrusive material and can therefore be discounted. The example from Phase 6, with a *terminus post quem* of early to mid-2nd century, is less easy to dismiss. The presence of a handful of Group D *tegulae* in 2nd-century contexts at Gorse Stacks should also be noted, particularly as this site produced very little material which post-dates AD 140 (Cuttler *et al* 2012). Although well-dated Group C's of 1st-century date from London suggest that Warry's start date for this type may be wrong, it does not seem to have had a widespread distribution outside London before the mid-2nd century (Mills 2013, 459). For example, Group C *tegulae* at York have been found in association with buildings of mid-late 2nd and early 3rd-century date, which fits with the date span suggested by Warry (McComish 2012, 234). An analysis of Warry's data carried out by Mills suggests that the greatest demand for Group D *tegulae* was at high-status rural sites, with hardly any military connection (Mills 2013, 460). If so, the presence of Group D *tegulae* at the amphitheatre and other sites at Chester, from both the fortress and *canabae*, would appear to be an unusual occurrence. The presence of Group D *tegulae* at Chester certainly contrasts with York, where the only forms recovered comprise Groups A–C, with B the most common form (McComish 2012, 82). There seems to have been an overall decline in the use of tile at York from the 3rd century onwards, with a lack of evidence for its manufacture after *c* AD 250. Although earlier forms were sometimes recycled in later building work, tile had been largely replaced with stone by the early 4th century (McComish 2012, 89–90). A switch from the use of ceramic to stone *pilae* at York may also have occurred at this time (*ibid*, 256). At Chester, in contrast, the use of stone *pilae* as a replacement for the earlier brick-stack variety was particularly diagnostic of 4th-century hypocaust construction (Mason *et al* 2005, 78), with the earliest evidence for their use in the Elliptical Building baths no earlier than the late 3rd century (Mason 2000, 144). Warry has stated that he would expect to see Group D *tegulae* at Chester and confirmed the presence of an example of this type from the site of the legionary fortress bath-house (Newgate/Pepper Street 1963/4), during his original survey of the stamped material from Chester. He also noted other possible examples of this type, which were made in part with the use of a rectangular insert to form the lower cutaway. Group Cs are usually made by putting a rectangular insert into the mould and taking the lower diagonal slice for the cutaway with a knife, which is not how Group Ds are normally made (See Warry 2006b, 249–51 for a discussion of the lower cutaway forms). For this reason he was unsure whether they were type C or D. He suggests that the examples he saw may represent a local variation of the 3rd/4th-century form at Chester (P Warry, pers comm). The presence of a definite example of a Group D *tegula* at the legionary baths is of note as it is possible that the Group D tiles recovered from the amphitheatre may also represent building debris from the *thermae*.

Table 77 CBM forms in stratified amphitheatre deposits by phase.

Phases present	Form	Area A			Area B			Total		
		No frags	Wt (g)	% wt Area A	No frags	Wt (g)	% wt Area B	No frags	Wt (g)	% wt All
7	Antefix	2	54	0.1	0	0	0	2	54	0.06
3, 4, 5, 6, 7, 8, 9	Imbrex	91	4,159	7.7	69	5,122	14.4	160	9,281	10.3
3, 4, 5, 6, 7, 8, 9	Tegula	126	12,464	22.9	78	9,411	26.5	204	21,875	24.3
7, 9	Solid voussoir (<i>cuneatus</i>)	2	1,275	2.3	0	0	0	2	1,275	1.4
5, 6, 7, 8	Box tile (<i>tubulus</i>)	8	659	1.2	3	31	0.09	11	690	0.8
6	Facing tile (<i>parietalis</i>)	0	0	0	1	158	0.4	1	158	0.2
3, 5, 6, 7, 8, 9	Brick	35	13,130	24.2	29	6,707	18.9	64	19,837	22.1
6	Herringbone-floor brick	0	0	0	2	523	1.5	2	523	0.6
6	Finial/chimney	1	30	0.06	0	0	0	1	30	0.03
5, 6	Portable oven	1	12	0.02	4	233	0.7	5	245	0.3
3, 4, 5, 6, 7, 8, 9	Indeterminate	5,209	22,580	41.5	4,016	13,295	37.5	9,225	35,875	39.9
Total		5,475	54,363	99.98	4,202	35,480	99.99	9,677	89,843	99.99

Phases 3–9

Table 77 summarises the range of forms present within deposits relating to the construction and use of the amphitheatres by phase. Comparison with Table 76 demonstrates that all forms except for vaulting tubes, half-box tile and disc/stopper were present in these phases.

Amphitheatre 1a: Phases 4 and 5

Material from contexts up to and including the construction of Amphitheatre 1a in Phase 4 was entirely undiagnostic. The earliest Phase 5 deposit around the outer wall of Amphitheatre 1a (1075) produced 377 fragments (2,416 g). Most are indeterminate but a range of identifiable forms was also recovered including roof tile, bricks and a piece of box tile. The final layer associated with the use of Amphitheatre 1a in Area A (625) produced 1,226 fragments (8,273 g) of CBM. Most are indeterminate but a range of identifiable forms was also recovered including a group A *tegula* dating to c AD 100–120, bricks, including a fragment of *tegula bipedalis*, and one of several fragments of box tile from these contexts. The roof tile includes a ?*tegula* with an unusual lugged corner (Cat no 1).

Amphitheatre 1b: Phases 6 and 7

During the construction of Amphitheatre 1b in Phase 6, small quantities of CBM were incorporated in the seating bank material placed around the timber frames in Area A (99 fragments (423 g)). The only diagnostic piece was part of a wheel-thrown finial/chimney with oval knife-cut window (Cat no 2).

The seating bank deposits of Phase 6 in Area B produced 4,202 fragments (35.48 kg) of CBM. All types listed in Table 76, except for solid voussoir and antefix, were present.

The roof tile includes fragments of Warry group A *tegulae*, dating from c AD 90/100 to 120 and a single probable group D1 *tegula*, which is dated by Warry to between c AD 240–380 and so must be intrusive to this phase. Box tile includes both combed and knife-scored varieties. Combed box tiles had generally replaced scored forms by the early 2nd century (Black 1996, 64; Betts 2000, 3; Ward 1999, 48) as combing was more efficient than scoring, providing a much better grip for keying (Brodrribb, 1987, 109). The assemblage also includes a single fragment of facing tile (*parietalis*). These are known to have been in use in London and south-east England (alongside thin-walled, knife-scored box tiles and half-box tiles) in the late 1st century and to have been generally replaced by combed and relief-patterned box tiles in the early 2nd century (Black 1996, 62). Finally there was at least one *opus spicatum* brick. The presence of these small bricks is of note, as they were commonly used, set on edge in a herringbone pattern, for the construction of hard-wearing floors or external paving. They are known to have been used extensively in both the fortress baths and the western extra-mural bath-house in Chester. Herringbone floors are not particularly common in Britain, though York has produced a single example, found on the site of a major public baths in the *colonia* (McComish 2012, 183). Plain brick floors paved with large square or rectangular bricks are more usual (Brodrribb 1987, 52) in the province.

The seating bank dumps would have been imported to the site as rubble, to be used, along with other debris and rubbish, as hardcore for building up the *cavea*, thus all these types of CBM were available as scrap at the time the seating bank was created, in the Flavian-Trajanic period, around c AD 100. Apart from the single Warry

Table 78 Roman CBM forms in early post-Roman and robbing contexts by phase.

Phases present	Form	Area A			Area B			Area C			Total		
		No	Wt (g)	% wt A	No	Wt (g)	% wt B	No	Wt (g)	% wt C	No	Wt (g)	% wt
10, 11b	Antefix	2	200	0.2	1	53	0.2	0	0	0	3	253	0.2
10, 11a, 11b	<i>Imbrex</i>	135	15,407	14.3	53	5,203	16.1	17	1,620	12.8	205	22,230	14.6
10, 11–11b	<i>Tegula</i>	189	30,470	28.4	93	14,560	45	15	4,938	39.1	297	49,968	32.8
10, 11b	Solid voussoir (<i>cuneatus</i>)	1	443	0.4	0	0	0	1	113	0.9	2	556	0.4
10, 11a, 11b	Box tile (<i>tubulus</i>)	17	1,774	1.7	4	150	0.5	2	251	2	23	2175	1.4
10, 11b	Half-box tile (<i>tegula hamata</i>)	0	0	0	2	567	1.8	0	0	0	2	567	0.4
11b	Facing tile (<i>parietalis</i>)	0	0	0	1	72	0.2	0	0	0	1	72	0.05
10, 11–11b	Brick	57	46,107	42.9	14	1,636	5.1	3	1,390	11	74	49,133	32.2
10, 11a, 11b	Herringbone-floor brick	3	696	0.6	0	0	0	0	0	0	3	696	0.5
10	Finial/Chimney	0	0	0	2	101	0.3	0	0	0	2	101	0.07
11a	Disc/Stopper	1	33	0.03	0	0	0	0	0	0	1	33	0.02
10, 11a, 11b	Portable oven	5	735	0.7	1	75	0.2	1	42	0.3	7	852	0.6
10, 11–11b	Indeterminate	946	11,593	10.8	944	9,932	30.7	4,629	4,284	33.9	6,519	25,809	16.9
	Total	1,356	107,458	100.03	1,115	32,349	100.1	4,668	12,638	100	7,139	152,445	100.14

type D1 *tegula* fragment the material is consistent with such a date.

The material accumulated around the walls of Amphitheatre 1b in Phase 7 included 1,860 fragments (23.52 kg) of CBM. This assemblage was predominantly undiagnostic, mainly comprising roofing material, but also included knife-scored box tile, brick including *tegula bipedalis*, two fragments of solid voussoir (*cuneatus*), and two fragments of *Legio XX* antefix (Cat Nos 3, 4).

Although roof tile is ubiquitous, the question arises as to the origin of the more specialist types. It is possible that some of these forms originated in the fortress bath-house or from the possible small bath-house to the south of the amphitheatre, just above the river (Carrington 2012a, 309). In the fortress baths herringbone flooring, composed of *opus spicatum* bricks, was used in the original Flavian swimming baths, pools and *labrum* alcove. Box tiles (*tubuli*) were used for the wall jacketing (*tubulatio*) of the heated rooms and also for the original Flavian vaulting of the bathing halls. The Flavian period brick-stack *pilae* of the baths were composed of *pedalis* bricks, which were largely replaced by *bessales* during the Severan reconstruction and finally, by sandstone *pilae*, in the early 4th-century alterations. The *cuneatus* fragments may derive from early bath-house vaulting. The finial/chimney fragments from the amphitheatre may also have come from the fortress baths. A single fragment was recovered from a 3rd-century context at the site (Dunn, Jones and Mason 2005, 88). A ‘chimney pot or ventilator’ was also recovered from contexts east of

the bath-house at Prestatyn (Blockley 1989c, 166 and 169 fig 92.120). Although finial/chimney sherds are rare at York, McComish has noted their association with hypocausts, in that they are always found on sites which also yielded flue tiles (2012, 148–9). Fragments of two ‘lamp chimneys’ were also recovered from the London amphitheatre, one came from a road surface layer at the eastern entrance, the other was unstratified (Betts 2008, 164). If these specialist fragments do originate from the legionary bath-house, it seems likely that they come from dumps of broken or superfluous building material. The construction of the fortress baths appears to have been broadly complete by AD 79 (Mason *et al* 2005, 6)

Amphitheatre 2: Phases 8 and 9

There was very little CBM from these phases, and the mixture is largely as for the preceeding phases. however a Warry group C *tegula* tentatively dated *c* AD 160–260 provides a possible *terminus post quem* for the make-up layer of the first road surface outside the outer wall of Amphitheatre 2 (1011).

Phases 10–11b

CBM found residually in early post-Roman and robbing contexts is summarised in Table 78. The mixture of material is very much as in previous phases, although it does include several items of intrinsic interest including fragments of antefix and *Legio XX* stamps (Cat Nos 5–13).

Table 79 Roman CBM forms in later post-Roman Phases 12–21 by Area.

Form	Area A			Area B			Area C			Total		
	No frags	Wt (g)	% wt A	No frags	Wt (g)	% wt B	No frags	Wt (g)	% wt C	No frags	Wt (g)	% wt All
Antefix	0	0	0	1	20	0.02	0	0	0	1	20	0.01
Imbrex	156	15,474	19.3	182	12,384	14.1	171	13,274	17.7	509	41,132	16.9
Tegula	166	30,757	38.3	230	30,518	34.8	167	23,852	31.7	563	85,127	35
Vaulting tube (<i>tubi fittili</i>)	3	36	0.04	4	82	0.09	3	36	0.05	10	154	0.1
Box tile (<i>tubulus</i>)	14	1,713	2.1	12	985	1.1	17	1,583	2.1	43	4,281	1.8
Facing tile (<i>parietalis</i>)	0	0	0	1	1,131	1.3	0	0	0	1	1,131	0.5
Brick	46	14,572	18.1	69	16,772	19.1	39	10,703	14.2	154	42,047	17.3
Herringbone-floor brick	2	406	0.5	3	353	0.4	2	155	0.2	7	914	0.4
Finial/Chimney	6	796	1	1	72	0.08	1	122	0.2	8	990	0.4
Disc/Stopper	0	0	0	2	41	0.05	0	0	0	2	41	0.02
Portable oven	0	0	0	3	184	0.2	8	1,077	1.4	11	1,261	0.5
Indeterminate	1,936	16,546	20.6	2,036	25,117	28.7	1,800	24,364	32.4	5,772	66,027	27.2
Total	2,329	80,300	99.94	2,544	87,659	99.94	2,208	75,166	99.95	7,081	243,125	100.13

Phases 12–21

CBM found residually in medieval, post-medieval and modern contexts is summarised in Table 79. Most forms represented in earlier phases appear in this table. The assemblage includes *tegulae* of all Warry types.

The one form that appears only in these residual contexts is represented by ten vaulting tube (*tubi fittili*) fragments. These are the only items which can be stated with total confidence to have come from the fortress bath-house. They are thought to date to the reconstruction of the vaulting over the bathing halls during a major refurbishment of the baths in the second quarter of the 3rd century (Mason *et al* 2005, 38–9). Stray examples were also recovered in 1969 from the medieval robbing debris which covered the baths suite immediately south of the so-called Elliptical Building (*ibid*, 150–1). A single fragment was also recovered from robbing debris at the western extramural baths in Watergate Street in 1989 (Dunn 2012, 238). Their absence from all earlier phases at the amphitheatre perhaps adds weight to the view that they do indeed date to this period.

Catalogue

The catalogue lists CBM pieces of particular intrinsic interest.

- 1 ?*Tegula*; flange fragment with unusual ‘lugged corner’, all edges of which are sanded and intended at manufacture, rather than a secondary modification; smooth/sanded underside and side of flange; finger-groove at base of (missing) flange; re-used-traces of Roman mortar attached to broken edges; Fl W: 26 mm, Th: 28 mm. A (625): Phase 5 layer of silty clay; SF 9580. Fig 324.

- 2 Finial/chimney; wall fragment with part of knife-cut, oval window, cut from exterior to interior, probably while leather-hard. Oxidised fabric, wheel-thrown; Th: 7–10 mm, external Diam: 150 mm. A (624): Phase 6 layer of red sand; SF 9854. Lowther group A (1972, 146; 1976, 48). Fig 324.
- 3 Antefix; edge fragment of Twentieth Legion inscribed antefix with part of *phalera* and spear on plain-edged form. Partly sanded edge; Th: 17 mm. A (1056): Phase 7 layer of red sand; SF 9582. Grimes 1930, 210 fig 58.1, 5 or 6; RIB II.4, 2458.3, 2458.6 or 2458.7. Fig 324.
- 4 Antefix; middle fragment of Twentieth Legion inscribed antefix with partial moulded inscription: JEG[. Smooth underside. Traces of white slip on upper surface; Th: 15 mm. A (672): Phase 7 dump deposit of red/grey sand; SF 9562. Probably Grimes 1930, 210 fig 58.2; RIB II.4, 2458.2. Fig 324.
- 5 Antefix; edge fragment of Twentieth Legion inscribed antefix with part of boar’s head and inner stem of final letter ‘X’. Trimmed/wiped edge, battered upper surface; Th: 19 mm. A (852): Phase 10 fill of robber trench; SF 9787. Grimes 1930, 210 fig 58.1 or 2; RIB II.4, 2458.3 or 2458.2. Fig 324.
- 6 ?Antefix; edge fragment with indeterminate moulded design; sanded underside and part of upper surface; Th: 30 mm. A (891): Phase 10 fill of robber trench; SF 9789. Fig 324.
- 7 Finial/chimney; wall fragment with applied frill

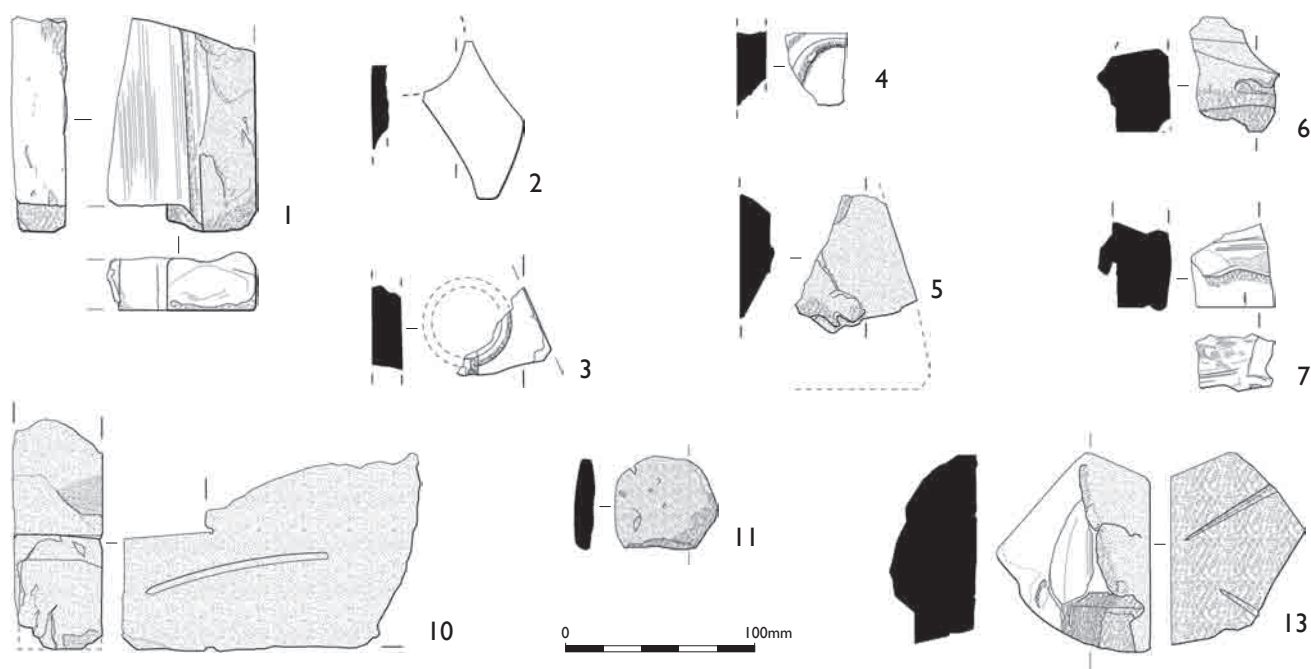


Fig 324 Building materials: *Tegula* fragment, BM Cat no 1; Finial/ chimney fragment, BM Cat no 2; Antefix fragments, BM Cat nos 3–6; Finial/ chimney fragment, BM Cat no 7; Brick fragment, BM Cat no 10; disc/stopper, BM Cat no 11; Half-box tile fragment, BM Cat no 13.

and top edge of horizontal knife-cut window below friill. Oxidised fabric. Wheel-thrown. Lightly burnt interior; Th: 28 mm, External Diam: 98 mm. B (2611): Phase 10 seating bank deposit; SF 9586. Lowther group B (1972, 147; 1976, 41–7). Fig 324.

8 Indeterminate; middle fragment (chip) with Twentieth Legion stamp: partial fishtail 'E'. C (3151): Phase 10b fill of beam-slot; SF 9750. Grimes 1930, 211 *cf* fig 59.11–14, 17 and 24; RIB II.4, 2463.14, RIB II.4, 2463.21, 2463.44, 2463.54, 2463.55 and 2463.58).

9 Indeterminate; middle fragment (chip) with partial Twentieth Legion stamp:]XVV. C (3115): Phase 10g fill of pit; SF 9147; Grimes 1930, 211 fig 59.17; RIB II.4, 2463.21. Fig 325.

10 Brick: lugged corner of a tapered brick with smooth/sanded edge and 'underside'. Knife-trimmed lug and end/edge; smooth 'upper' surface (orientation uncertain). Single faint signature mark; Th: 45–50 mm. C (3085); Phase 10g demolition layer; SF 9625. *cf* lugged, tapered brick from Caerleon fortress baths (Zienkiewicz 1986a, 325 and 326, fig 1). Fig 324.

11 Disc/stopper; roughly shaped roundel formed from an indeterminate fragment. Almost complete; Th: *c* 10 mm, Diam: *c* 54 mm. A (322): Phase 11a fill of robber trench; SF 9761. Fig 324.

12 Antefix; Middle fragment of Twentieth Legion inscribed antefix with partial moulded inscription:]GX[. Faded cream slip on upper surface. Smooth

reverse; Th: 21 mm. B (2561): fill of robber trench; SF 8671. Grimes 1930, 210 fig 58.1 or 2; RIB II.4, 2458.3 or 2458.2.

13 Half-box tile (*tegula hamata*); flange fragment. Sanded face with criss-cross knife-scoring; sanded side of flange, trimmed along bottom. Edge of knife-cut vent with angled back; back and top surface of vent are lightly sanded. Unusual form; Th: 40 mm, Fl W: 30 mm. B (2540): dump of rubbish associated with Amphitheatre 1b seating bank deposit; SF 9852. Grimes 1930, 135. Fig 324.

14 Brick; middle fragment with hobnail impressions, probably made by the officer in charge of the tilery testing the hardness of the tiles (Warry 2006a, 16); Th: >32 mm. A (1): Post-Roman; SF 9543. Fig 326.

15 Disc/stopper; indeterminate fragment roughly shaped to form a disc (?counter); edges partially smoothed; Th: *c* 8 mm, Diam: *c* 42–45 mm. B (2094); Post-Roman; SF 9794. Fig 326.

16 Box tile or facing tile; middle fragment with possible textile impression on the plain unsanded face. B (2114); Post-Roman; SF 9796. Fig 327.

17 Disc/stopper; approximately one-third of a rough disc formed from a middle fragment of *imbrex*; trimmed shape; Th: *c* 20 mm, Diam (incomplete): >65 mm. B (2247); Post-Roman; SF 9573. Fig 326.

18 ?*Tegula*; middle fragment with worn partial Chester type 83, Twentieth Legion stamp: LE[. This stamp only occurs on Warry group A/B

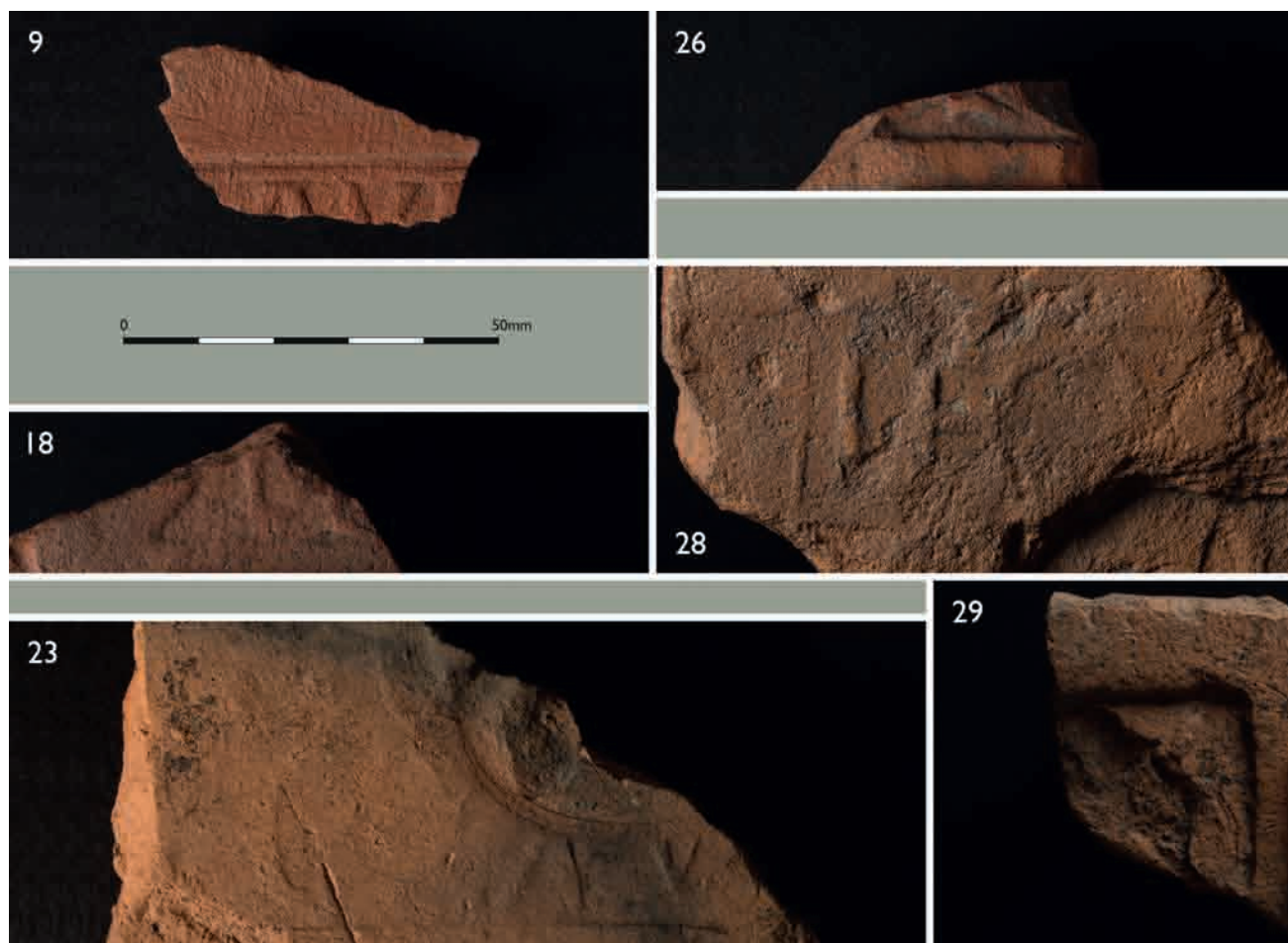


Fig 325 Building materials: Tile stamps, BM Cat nos 9, 18, 23, 26, 28, 29.

tegulae. It is in contemporary use with Holt 18 (RIB II.4, 2463.39); Th: 28 mm. B (2294): post-Roman; SF 8039. RIB II.4, 2463.38. *c* AD 90/100–140. Fig 325.

19 ?Finial/chimney; wall fragment. Oxidised fabric. Wheel-thrown; Th: *c* 15 mm. B (2346): Post-Roman; SF 9815. Lowther group B (1972, 147; 1976, 41–7). Fig 326.

20 ?Antefix; middle fragment with moulded design of ?part of snout of wild boar (facing right), Holt type uncertain; Th (incomplete): >9 mm. B (2388): Post-Roman; SF 9588. Fig 326.

21 Indeterminate; middle fragment (chip) with hobnail imprints in upper surface. These were probably made by the officer in charge of the tile-works testing the hardness of the tiles (Warry 2006a, 16); Th: > 5 mm. B (2388): Post-Roman; SF 9833. Fig 326.

22 Herringbone-floor (*opus spicatum*) brick with sanded edges and underside. Clay pushed up into upstanding ridge by fingers on one edge, when lifted while still soft; L: >90 mm, W: 73 mm, Th: 30 mm. B (2425): Post-Roman; SF (9837). Fig 326.

23 *Tegula*; middle fragment with very faint (lightly impressed) partial Holt type 7 Twentieth Legion stamp: JEGXXV, overlain by looped signature. This stamp only occurs on Warry group A/B *tegulae*; Th: 30 mm. C (3019): Post-Roman; SF 9823. Grimes 1930, 211 fig 59.7; RIB II. 4, 2463.36. AD 90/100–140. Fig 325.

24 Finial/chimney; base fragment with ?signature mark. Oxidised fabric. Wheel-thrown; Diam: 210 mm; Th: *c* 20 mm (*c* 26 mm at base). C (3024); Post-Roman; SF 9904. Lowther group B (1972, 147; 1976, 41–7). Fig 326.

25 *Imbrex*; middle fragment with faint (lightly impressed) hobnail impressions and signature across top of gable. On *tegulae*, these were probably made by the officer in charge of the tile-works testing the hardness of the tiles (Warry 2006a, 16); Th: 24 mm. C (3047): Post-Roman; SF 9603. Fig 326.

26 *Tegula*; middle fragment with partial Twentieth Legion ?Holt type 4 stamp J[L]; Th: 24 mm. C (3067); Post-Roman; SF 9615; Grimes 1930, 211 fig 59.4; RIB II.4, 2463.11. Fig 325.

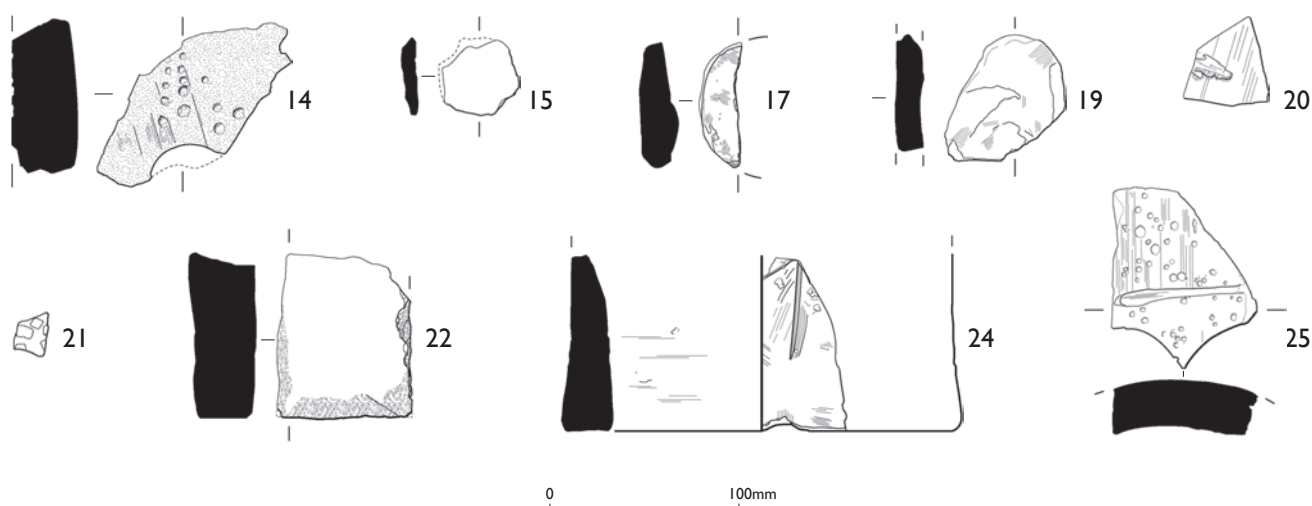


Fig 326 Building materials: Ceramic building materials, BM Cat nos in range 14–25.



Fig 327 Building materials: Box- or facing tile with fabric impression, BM Cat no 16.

- 27 Indeterminate; middle fragment with possible textile impression. C (3068); Post-Roman; SF 9618.
- 28 *Tegula*; middle fragment with partial Twentieth Legion ?Holt type 5 stamp: LEGX[overlain by hobnail impressions. These were probably made by the officer in charge of the tile-works testing the hardness of the tiles (Warry 2006a, 16); Th: 35 mm. C (3079); Post-Roman; SF 8481. Grimes 1930, 211 fig 59.5; RIB II.4, 2463.30. Fig 325.
- 29 Indeterminate; middle fragment with partial ?Webster type 46 Twentieth Legion stamp: JV; Th: c 33 mm. B u/s: Unstratified; SF 8036. RIB II.4, 2463.9. Fig 325.

Discussion

It is difficult to draw comparisons with other amphitheatres in Britain, as ceramic building material assemblages from these sites have rarely been published in detail.

Those summaries that do exist give little or no hint of the quantities involved or the range and variety of forms recovered. In his summary of the assemblage from London, Betts merely states that a 'large quantity of ceramic and stone building material was recovered', although he does list the forms retrieved and notes that the assemblage was principally composed of brick and roofing tile, with a much smaller quantity of facing tile, hollow voussoirs (including 'armchair' voussoirs), box tiles and other forms. The latter included *tesserae*, a fragment of water pipe and an odd-shaped tile. Lydion bricks were used in horizontal bonding-courses in the masonry walls of the amphitheatre but most of the other forms probably came from buildings that surrounded the monument (Betts 2008, 164–9). Large amounts of roofing tile and brick were incorporated into the arena make-up dumps and entranceway surface deposits, along with smaller amounts of other building material, including mortar, gravel and stone. The inclusion of these various materials may have been deliberate, in order to provide a firm bedding for the surfaces (Bateman *et al* 2008, 60 and 104). Inverted *imbrices* were also used to create a feeder drain for the arena perimeter drain (*ibid*, 66 fig 64). The published account of the excavations at Caerleon amphitheatre contains only a catalogue of the legionary stamps, although the forms on which the stamps occur are generally not described, apart from a few *in situ* examples on bricks (Miller 1928, 159–61 and plate xxxi). At Silchester, 287.8 kg of ceramic building material was recovered from Roman contexts, with the largest quantity retrieved from the early 3rd-century stone phase of the monument. Here, ceramic building material was imported with other material to raise the height of the arena surface and to form and line drains through the arena wall and at the south entrance. Some may also have been laid deliberately to provide a hard surface during the building of the arena wall. The use of brick as a bonding course in masonry walls at Silchester seems to have fallen out of favour by the 3rd

century, when it was replaced by decorative string-courses of brown ironstone, as seen in both the arena wall and the late 3rd-century town wall (Fulford 1989, 37 and 48–9). Forms from Roman phases are recorded by the number of fragments recovered and comprise *tegulae* ($\times 20$), *imbrices* ($\times 8$), *tegulae mammatae* ($\times 3$) ‘flat tiles’ ($\times 340$) and a single *tessera* (Fulford and Timby 1989, 143 table v). The ‘flat tiles’, which form the majority of the assemblage, range in thickness from 38–60 mm and so clearly include a range of brick types. Other forms noted comprise box tiles (including combed forms) and a fragment of tile ‘shaped into a rough disc’. These were presumably all recovered from post-Roman contexts. Their quantities are not stated, neither is the amount of indeterminate material that must have been retrieved (Fulford and Timby 1989, 142–6 and plates xxiiib, xxiva,b).

Unlike London, Caerleon and Silchester, there is no direct evidence that ceramic building material was used in the construction of the amphitheatre at Chester. The potential of the material to supply information about the structure of the building itself is therefore limited. However, it was used alongside dumps of other material as make-up for the seating bank and also as levelling for various road surfaces. Some was deposited in pits along with other rubbish. It may also have been used as flooring in some of the temporary structures built outside the amphitheatre and some of the ancillary buildings may also have had tiled roofs, for example the stone phase of the shrine with its painted plaster walls. Some of the forms, especially the portable oven fragments (pp 343–353), may have derived from activities associated with the amphitheatre.

The Twentieth Legion inscribed antefixes presumably adorned the more important/prestigious military buildings and so are perhaps more likely to have originated in the fortress rather than the *canabae*. The roof tiles probably came from a combination of the two.

The fragments of finial/chimney are of interest, as their exact function is unknown. There is no clear evidence that they were used on roofs, although they may have functioned as ventilators or finials. They may also have served as covers for lamps or for burning aromatics. They are found all over Britain, mainly on civilian sites, although some have come from temple sites. They represent objects of more than one type and so cannot be given a single interpretation (Ward 1999, 26–7 and 30). Lowther identified two main groups. His group A are thin-walled, wheel-made vessels in a ‘pottery’ fabric, which were probably not intended for external use. The examples from temple sites may have served a ‘ritual’ function. His group B, which may have functioned as ventilators or ornamental roof finials, were generally made in a ‘tile’ fabric and were probably intended for external use (Lowther 1976). They are associated with hypocausts at York and it is interesting that examples from Chester were recovered from the site of the fortress *thermae* in 1963/4 (see above) and also from the site of the Elliptical Building, which had an associated

bath-house, although this was not excavated at the time (Newstead and Droop 1939, 26–7 and fig 4.7). There is no direct evidence that any of the finial/chimney fragments were associated with the shrine, which was situated just to the west of the north entrance, outside the outer wall of Amphitheatre 1b, although this remains a possibility.

It has been possible to assign dates to some of the forms recovered and this has provided additional chronological evidence for the various phases of construction and rebuilding. Much of the assemblage presumably derived from demolished buildings surrounding the amphitheatre in both the fortress and the nearby *canabae*. Building debris from the fortress probably includes the fragments of *tubi fittili* used in the construction of the high-vaulted rooms of the legionary baths which seem to date to the reconstruction of the fortress and its buildings in the second quarter of the 3rd century (Mason *et al* 2005, 38–9). A large number of vaulting tube fragments were retrieved from the legionary fortress baths at York, where they appear in demolition deposits of probable Antonine date (c AD 160+), although the ceramic evidence for this demolition is poor (McComish 2012, 263; Monaghan 1997, 1059–64). The baths at York, however, are thought to have gone out of use by the early 3rd century (*ibid*, 1064). The *tubi fittili* from the legionary fortress baths at Caerleon were found in demolition debris of late 3rd-century date, where they can be no later in date than the final, probable early 3rd century, construction phase, although they could also be much earlier (Zienkiewicz 1986a, 334–6).

Small floor bricks laid in a herringbone pattern are known to have been used as internal paving in the original Flavian construction of the fortress *thermae* (Mason *et al* 2005, 15). The corner fragment of a lugged and tapered brick, recovered from a Phase 10 context, (3085), in Area C (Cat no 10), is comparable to the lugged bricks from the Caerleon fortress baths (Zienkiewicz 1986a, 325 and 326, fig 1). Similar examples were also recovered during excavations in 2001 at 25 Bridge Street, Chester (Jones 2008, 136 and Ill 4.1.5). The handful of *cuneati* from the site (which include two from Roman phases 7 and 9, as well as examples from Phases 10d and 11b) may well have been used in earlier periods of vaulting at the baths. On the other hand, it is possible that arched or vaulted brickwork may have been used in some of the construction phases of the amphitheatre, although there is no evidence that this was the case.

Cement Mix

Methodology

The cement mix was analysed in terms of quantity, range and variety, condition and provenance. All fragments were examined microscopically at $\times 20$ magnification in order to determine the aggregates and fillers used in their composition. The assemblage was quantified by fragment count and weight (in grammes) and measurements (in

mm) were taken of any complete dimensions. Small-find numbers were assigned to fragments exhibiting atypical or unusual features.

In describing the cement mix, the following definitions have been used:

- Concrete:** composed of a cement (binding material) plus a coarse aggregate (where the majority of the aggregate is >5 mm) and water (Siddall 2000, 2). Most Roman concrete used a lime-cement.
- Mortar:** composed of a cement (generally slaked lime) plus a fine aggregate (where the majority of the aggregate is <5 mm) and water (*ibid*, 2).
- Cement:** a fine material used to bind the aggregates together, eg hydrated (or slaked) lime also known as 'lime'.
- Aggregate:** (i) Inorganic: eg river gravels, crushed/ weathered rock, crushed fired clay (generally ceramic building material but also pottery), sand, etc. (ii) Organic: eg charcoal, hay/straw, etc. Organic aggregates improved tensile strength, especially in plasters (internal wall finishing) and renders (external wall finishing) (Elsen 2006, 1418–9).
- Opus signinum:** (*cocciopesto*) – a concrete or mortar composed of an hydraulic cement mix of hydrated lime, ceramic powder and finely crushed fired clay, the addition of which acted as an artificial pozzolana and caused discolouration from white through pale pink to orange (Karatasios *et al* 2014, 271; Siddall 2000, 2). It is water-resistant and was used in water-bearing constructions and to protect the inside of walls from moisture, eg foundations, floors that lay below the water table, baths, aqueducts and water cisterns, etc (O'Hare 1995, 5; Elsen 2006, 1419).
- Pozzolana:** a natural or artificial alumina-silicate material that forms an hydraulic compound when mixed with hydrated lime, eg volcanic ash deposits from Pozzuoli, Italy and the Greek islands of Santorini and Milos; or different types of finely-ground ceramic powder. The addition of pozzolanas to lime mixtures promotes a chemical reaction, which allows them to harden and develop strength in humid or extremely wet conditions (Karatasios *et al* 2014, 271 and 277).
- Hydrated lime:** produced by burning limestone (calcium carbonate); this produces quicklime

(unslaked lime). The quicklime is then slaked, by the addition of water, to produce hydrated lime. The process of slaking generates a lot of heat, as quicklime reacts very violently with water. Hydrated lime hardens by carbonation (absorbs carbon dioxide), which re-converts the lime back to calcium carbonate. This whole process is known as the lime cycle. To make a water-resistant cement mix, the Romans mixed hydrated lime with a reactive silica material (in Britain this was usually finely-crushed fired clay) and water (See '*Opus signinum*', above).

Quantity

The site produced a total assemblage of 2,854 fragments of Roman cement mix weighing 40,256 g, with an average fragment weight of 14.1 g (Table 80). 75.3 % by weight of the assemblage was hand-collected, 24.7 % came from sample residues. Area A produced the largest assemblage by both fragment count, with 78.2 % of the total, and weight (72.8 %). Area B produced 20.9 % by fragment count and 25.2 % by weight of the total and Area C just 0.8 % by fragment count and 1.9 % by weight. 0.1 % by both fragment count and weight was found unstratified.

Roman phases produced 1,283 fragments of cement mix with a weight of 11,900 g (45.0 % by fragment count and 29.6 % by weight of the total assemblage); with an average fragment weight of 9.3 g. Post-Roman phases produced 54.9 % by fragment count (1,567 fragments) and 70.2 % by weight (28,270 g) of the total, with an average fragment weight of 18.0 g. Two fragments/34 g (0.1 % by count and 0.08 % by weight) were recovered from unphased contexts in Area A and two others weighing 52 g (0.1 % by count and weight) were unstratified.

29.6 % by weight of the assemblage was recovered from Roman Phases 3 to 9, with most (16.8 % by weight of the total) coming from Phase 7. Amphitheatre 2 change of use and wall robbing Phase 10–11b, yielded 51.2 %, and post-Roman Phases, 12–21, produced 19.1 %. Unphased contexts in Area A produced 0.1 % and another 0.1 % was unstratified.

Range and variety

Few diagnostic features were recovered; the cement mix comprises mainly featureless, indeterminate fragments (2,611; 25,771 g), comprising 64.0 % by weight of the total assemblage. Fragments with at least one surface, where the cement mix had been flattened, probably by walling blocks, comprise 14.2 % by weight of the assemblage. Floor fragments comprise 10.1 % by weight of the total. Edge, edge/surface, edge/corner and corner fragments together comprise 6.5 % by weight of the forms recovered.

Table 80 Quantification of cement mix by Area and phase.

Phase	Area A				Area B				Area C				Total			
	No	% Area A	Wt (g)	% Area A	No	% Area B	Wt (g)	% Area B	No	% Area C	Wt (g)	% Area C	No	% total	Wt (g)	% total
3	11	0.5	166	0.6	0	0	0	0	0	0	0	0	11	0.4	166	0.4
4	3	0.1	54	0.2	0	0	0	0	0	0	0	0	3	0.1	54	0.1
5	353	15.8	2,410	8.2	0	0	0	0	0	0	0	0	353	12.4	2,410	6
6	47	2.1	426	1.5	193	100	1664	100	0	0	0	0	240	8.4	2,090	5.2
7	642	28.8	6,762	23.1	0	0	0	0	0	0	0	0	642	22.5	6,762	16.8
8	16	0.7	261	0.9	0	0	0	0	0	0	0	0	16	0.6	261	0.6
9	18	0.8	157	0.5	0	0	0	0	0	0	0	0	18	0.6	157	0.4
Total	1,090	48.8	10,236	34.9	193	32.3	1664	16.4	0	0	0	0	1,283	45	11,900	29.6
10	31	1.4	1,247	4.3	8	1.3	252	2.3	2	9.1	2	0.3	41	1.4	1,501	3.7
11a	708	31.7	9,611	32.8	10	1.7	961	9.5	0	0	0	0	718	25.2	10,572	26.3
11b	249	11.2	2,666	9.1	340	57	5,862	57.9	0	0	0	0	589	20.6	8,528	21.2
Total	988	44.2	13,524	46.1	358	60	7,075	69.9	2	9.1	2	0.3	1,348	47.2	20,601	51.2
Other PR 12–21	153	6.9	5,514	18.8	46	7.7	1,386	13.7	20	90.9	769	99.7	219	7.7	7,669	19.1
Unphased	2	0.1	34	0.1	0	0	0	0	0	0	0	0	2	0.1	34	0.08
Unstratified	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	52	0.1
Total	2,233	100	29,308	99.9	597	100	10,125	100	22	100	771	100	2,854	100.1	40,256	100.08

A relatively wide range of cement mixes was recovered from the site, indicating a range of sources and/or uses. All are composed of hydrated lime cement with the addition of a varying range of aggregates and fillers. Aggregates comprise sand grains (which vary in both colour and type), rounded river gravels, rare large pebbles and crushed fired clay (especially ceramic building material). Fillers comprise hay/straw, the presence of which is attested by the negative impressions of plant stems/stalks and elongated voids, as well as rare instances of original plant material surviving *in situ*. Lumps of hydrated lime are common in many of the mixes and fragments of charcoal, ranging in size from small black flecks to large pieces, also appear regularly. ‘Lime lumps’ are binder derived but appear to act as a form of aggregate. Charcoal is probably present as a remnant of the limestone burning process (Elsen 2006, 1419–20).

Cement mixes were differentiated by variations in both colour and composition and six main types have been identified (Table 81). These comprise three groups (numbered 1–3) of *opus signinum*-type mortar/concrete* (*defined by aggregate size) and three types of sandy mortar (numbered 4–6). The *opus signinum* types vary in the amount of crushed fired clay present and also in the colour, type and amount of sand. The sandy mortars vary in the amount of river gravel present, as well as in the colour, type and amount of sand. Type 7 comprises fragments of ceramic building material coated in lime mortar which probably once formed the aggregate component of *opus signinum*.

Provenance

The sources of the raw materials used in the production of the various cements, mortars and concretes used for building work at the site would have been identical to those employed in the production of the painted plaster used in the shrine and on the arena wall (pp 137, 124). Water was readily available, as were the aggregates and fillers used. River gravels, sand and crushed ceramic building materials were easily obtainable in the local area. The presence of local red sand in the various mixes is attested by the fact that the sandier the mortar, the pinker it appears to be. Clear to yellow local sand was also used, creating a different colour range in the mixes, depending on how much was added to the hydrated lime cement.

There is no evidence for limestone-burning in Chester in the Roman period, suggesting that it probably took place close to the source of the stone. It would also have been easier and cheaper to transport the resultant quicklime or lime than the heavy, bulky raw stone. However, a reasonable quantity of limestone has been recovered from the site, suggesting that it may indeed have been transported in its raw state. The nearest, easily-exploitable sources of limestone in the region in the Roman period were Halkyn Mountain and the Llanfynydd/Frith area, 15–20 km distant from Chester respectively (Mason *et al* 2005, 51). It is possible that the quicklime or lime may have been transported to the fortress by sea, along with the lead ingots which were produced in Flintshire from *c* AD 74 onwards (Mason 2002, 93).

Table 81 Quantification of Roman cement mix by type and phase groups (Phases 10–11b = early post-Roman and robbing; phases 12–21 = later post-Roman phases).

	Roman phases						Phases 10–11b						Phases 12–21						Unphased						Unstratified						Total					
Type	No	%	Wt	%	No	%	Wt	%	No	%	Wt	%	No	%	Wt	%	No	%	Wt	%	No	%	Wt	%	No	%	Wt	%	No	%	Wt	%				
(1)	107	8.3	711	5.9	27	2	1,035	5	26	11.9	669	8.7	1	50	23	67.6	0	0	0	0	0	0	0	0	161	5.6	2,438	6.1	0	0	0	0				
(2)	140	10.9	1,006	8.3	16	1.2	116	0.6	8	3.7	269	3.5	0	0	0	0	0	0	0	0	0	0	0	0	164	5.7	1,391	3.5	0	0	0	0				
(3)	93	7.2	646	5.3	24	1.8	914	4.4	25	11.4	2,727	35.6	0	0	0	0	0	0	0	0	0	0	0	0	142	5	4,287	10.6	0	0	0	0				
(4)	78	6.1	103	0.9	67	5	1,340	6.5	29	13.2	51	0.7	0	0	0	0	0	0	0	0	0	0	0	0	174	6.1	1,494	3.7	0	0	0	0				
(5)	414	32.2	3,547	29.4	859	63.7	9,826	47.7	58	26.5	2,144	28	0	0	0	0	0	0	0	0	0	0	0	0	1,331	46.6	15,517	38.5	0	0	0	0				
(6)	196	15.5	1,331	12.5	319	23.7	6,713	32.6	14	6.4	401	5.2	0	0	0	0	0	0	0	0	0	0	0	0	529	18.5	8,445	21	0	0	0	0				
(7)	147	11.4	2,017	16.7	33	2.4	646	3.1	50	22.8	1,206	15.7	1	50	11	32.4	2	100	52	100	2	100	52	100	233	8.2	3,932	9.8	0	0	0	0				
(8)	76	5.9	1,075	8.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76	2.7	1,075	2.7	0	0	0	0					
(9)	17	1.3	1,301	10.8	0	0	0	0	8	3.7	201	2.6	0	0	0	0	0	0	0	0	0	0	0	0	25	0.9	1,502	3.7	0	0	0	0				
(10)	15	1.2	163	1.3	3	0.2	11	0.1	1	0.5	1	0.01	0	0	0	0	0	0	0	0	0	0	0	19	0.7	175	0.4	0	0	0	0					
Total	1,283	100	11,900	100	1,348	100	20,601	100	219	100	7,669	100	2	100	34	100	2	100	52	100	2	100	52	100	2,854	100	40,256	100	2	100	40,256	100				

Key to cement mix types

- 1 Cream/white *opus signinum*-type
- 2 Pale pink/orange *opus signinum*-type
- 3 Pink/orange *opus signinum*-type
- 4 Cream/white sandy
- 5 Pale grey/brown sandy
- 6 Pale pink/brown sandy
- 7 *Opus signinum* aggregate
- 8 Road surface fragments (burnt)
- 9 Two or three layers of cement mix
- 10 Unknown cement mix type

Discussion

The cement mix was found primarily in dumped deposits of Phases 5 and 6, like much of the other building material. Importantly, however, it was found in quantity in the robber trenches for the walls of the two amphitheatre buildings. It seems very likely that the mortar from within the robber trenches was the residue of robbing, in other words when the stone was removed mortar would be left behind, and it is probable that the stones were roughly cleaned before removal for reuse. If this is the case, the residual mortars in the robber trenches should give some idea of the mixes used in the construction of the buildings.

Amphitheatre 1

The robber trenches of the walls of Amphitheatre 1 in Area A produced 142 fragments (1,657 g) of Type 5 cement mix. The robber trench produced this material exclusively suggesting that this was the bonding material used in the wall construction. The Phase 5 dumps around the outer wall of Amphitheatre 1a in Area A produced small quantities of fragments of most types of cement mix represented on the site, but this material, like all the building material in these deposits was dumped from elsewhere. Similarly, the Phase 6 seating bank dumps associated with Amphitheatre 1b produced fragments of most types of material. The *opus signinum* fragments, like the CBM related to hypocausts, probably derived from the fortress baths.

Overall, as in the robber trenches, Type 5 cement mix was the most common from all contexts associated with Amphitheatre 1.

Amphitheatre 2

The Phase 11 robber trenches of the outer and *vomitorium* walls of Amphitheatre 2 produced large amounts of cement mix. In Area A a small section of the inner face of the outer wall of the amphitheatre survived. The masonry here was bonded with a very hard white lime mortar (Fig 156). Clay bonding to the foundations of the outer wall of Amphitheatre 2 in this area (1220) produced three fragments (215 g) of this material which is analysed as Type 1 hydraulic concrete.

Earth mix (daub)

Methodology

The earth mix (hereafter referred to as 'daub') was analysed in terms of quantity, fabric, range and variety, condition and provenance. All fragments were examined microscopically at $\times 20$ magnification in order to determine the binders, aggregates and reinforcements used in their composition.

The assemblage was quantified by fragment count and weight (in gm) and measurements (in mm) were taken of any complete dimensions. Small find numbers were assigned to fragments exhibiting unusual markings and atypical or unusual features.

Table 82 Roman daub quantified by Area.

Area	No frags	% no	Wt (g)	% wt	Av frag wt (g)
A	267	41.9	5131	55.6	5.9
B	1198	57.9	4083	44.2	3.4
C	4	0.2	19	0.2	4.75
Total	2069	100	9233	100	4.5

Quantity

The site produced a total assemblage of 2,069 fragments of Roman daub weighing 9,233 g, with an average fragment weight of 4.5 g (see Table 82). Just 13.9 % by weight of the assemblage was hand-collected, 86.1 % came from sample residues. The average fragment weight of the hand-collected assemblage is 21.5 g; that from sample residues is just 4.0 g.

Area A produced the largest assemblage by weight (55.6 %) of the total. Area B produced 44.2 % by weight of the total and Area C just 0.2 % by both fragment count and weight.

Roman phases produced 1,333 fragments of daub with a weight of 6,530 g (64.4 % by fragment count and 70.7 % by weight of the total assemblage); with an average fragment weight of 4.9 g. Post-Roman phases produced 35.5 % by fragment count (735 fragments) and 29.1 % by weight (2,685 g) of the total, with an average fragment weight of 3.7 g. A single fragment/18 g (0.1 % by count and 0.2 % by weight) was unstratified.

Daub is quantified by phase in Table 83. Within Roman phases the majority of the daub derives from contexts of Phase 5 in Area A and the Phase 6 seating bank dumps for Amphitheatre 1b in Area B.

Range and variety

Few diagnostic fragments were recovered and indeterminate featureless fragments (1,740 weighing 5,846 g), comprising 63.3 % by weight of the total assemblage, predominate. Thirteen fabrics were identified (Appendix 5), based on the coarse components, vegetal inclusions and/or organic voids present. The colour is varied, depending on whether the daub is fired or unfired and on how lightly or heavily it has been burnt, and colours may range within a single fragment from grey-brown to bright orange-red. All the fabrics are composed of sandy clay with varying amounts of other inclusions. It is likely that the daub was made from locally available clay and the sand may be either naturally-occurring within the clay or deliberately added as a fine inclusion. It is also possible that some of the differences observed may be due to natural variations in the local boulder clay. Daub fabrics can also vary greatly throughout a single structure and the relatively small fragment size (average fragment weight: 4.5 g) makes it unlikely that the full extent of variation within each fabric has been identified (Poole 2005, 1; Poole 2010, 141).

Table 83 Roman daub quantified by phase.

Phase	No frags	% no	Wt (g)	% wt	Av frag wt	
					(g)	% wt total
3	47	3.5	187	2.9	4	2
5	629	47.2	3,427	52.5	5.4	37.1
6	651	48.8	2,900	44.4	4.5	31.4
7	6	0.5	16	0.2	2.7	0.2
<i>Total Roman phases</i>	<i>1,333</i>	<i>100</i>	<i>6,530</i>	<i>100</i>	<i>4.9</i>	<i>70.7</i>
10	536	72.9	1,025	38.2	1.9	11.1
11a	44	6	233	8.7	5.3	2.5
11b	15	1.2	184	5.7	12.3	2
Other PR: 12–21	140	25.9	1,243	56.2	8.9	13.5
<i>Total post-Roman phases</i>	<i>735</i>	<i>100</i>	<i>2,685</i>	<i>100.1</i>	<i>3.7</i>	<i>29.1</i>
Unstratified	1	0.1	18	0.7	18	0.2
Total	2,069	100	9,233	100	4.5	100

Table 84 Quantification of Roman daub with markings by type and phase groups (Phases 10–11b = early post-Roman and robbing; phases 12–21 = later post-Roman phases).

	<i>Roman</i>						<i>Ph:10–11b</i>		<i>Ph:12–21</i>					
	<i>Area A</i>		<i>Area B</i>		<i>Total</i>		<i>Area B</i>		<i>Area A</i>		<i>Total</i>		<i>Site total</i>	
Marking	No	Wt (g)	No	Wt (g)	No	Wt (g)	No	Wt (g)	No	Wt (g)	No	Wt (g)	No	Wt (g)
Wattle impressions	10	218	5	69	15	287	0	0	13	137	13	137	28	424
Finger-wiped surface	3	22	4	65	7	87	0	0	0	0	0	0	7	87
Fine parallel ridges in surface	15	162	27	246	42	408	1	10	0	10	1	10	43	418
Combed/ridged surface	0	0	2	66	2	66	0	0	0	0	0	0	2	66
Total	28	402	38	446	66	848	1	10	13	137	14	147	80	995

Eighty fragments (995 g) bore markings, in the form of wattle impressions (all partial), ridging or finger-wiping of the surface. The types of markings identified are summarised in Table 84. Seventy-four fragments (722 g) bore traces of white limewash on the surface and a single fragment had small pieces of shell pressed into the surface. It is unclear whether this was deliberate or accidental. White-washing was often applied to provide a water-resistant surface.

Discussion

The material in the seating banks of Phase 6 was, like all other finds material from these contexts, transported as mixed debris for use in constructing the banks. Very little can therefore be said about the possible origin of this material, which might have been from buildings or other clay structures such as ovens. House daub generally has a high organic content, comprising straw, dung and/or animal hair, and is rarely encountered archaeologically; it only

tends to survive if the building burnt down with sufficient intensity to at least bake the daub. In such circumstances, one would expect a considerable quantity of daub to survive in the archaeological record, rather than the small number of fragments that are usually recovered (Poole, 2010, 142). It is more likely that the fragments of wall daub derive from ovens and once formed part of the upper walls of the oven dome. An interwoven wattle framework was sometimes used as a support for the upper walls or dome of both portable and permanent superstructures. The size of the wattles commonly used for such frameworks is <20 mm diameter (Poole 2007, 270 and 276). The edge and corner fragments may derive from the outer margins of oven plates or covers or from openings in the oven wall (Poole 2010, 143). It is highly likely that the surface fragments, including those with convex surfaces and those with evidence of moulding and shaping of the clay in the form of finger-ridging and -wiping, also derive from ovens, which may well have been used for domestic or other small-scale cooking and baking.

At least some of the material around the walls of Amphitheatre 1a in Phase 5, however, might have come from structures in this vicinity. Most of the daub from Phase 5 was recovered from fills of the large cess pit (1256). The assemblage from (1256) includes one partially vitrified fragment and another with a heavily vitrified surface, both of which may derive from a hearth or furnace. The fills of this pit also produced a quantity of corner, edge, edge/rim, surface and wall fragments, including pieces with wattle impressions. One has three wattle impressions on the reverse, including one complete diameter of 15 mm (Cat no 30). SF 10032, in Fabric 3 (Appendix 5), has a partial ?wattle impression (wattle Diam: c 10 mm) on the reverse and a domed surface (Cat no 33). Some of the wall fragments are also domed (convex) and several pieces have marks of shaping, in the form of finger ridging and wiping, on the surface. Most of this material is likely to derive from ovens, the discarded fragments of which were then deposited in the pit. It is possible that some of these structures also may have been used to provide hot food for visitors to the arena, alongside the portable clay ovens.

Catalogue

- 30 Surface fragment of daub in Fabric 11 (Appendix 5); three wattle impressions on the reverse, including one with a complete diameter (Diam: 15 mm). A (1216): fill of pit; SF 10031.
- 31 Domed surface fragment of daub in Fabric 3 (Appendix 5); partial ?wattle impression on the reverse (Diam: c 10 mm). A (1216): fill of pit; SF 10032.
- 32 Edge/rim fragment of daub (two adjoining pieces) in Fabric 2 (Appendix 5); partial wattle impressions on the reverse, one with a surviving diameter of 26 mm. Wall Th: 27 mm. B (2513): Phase 6 seating-bank deposit; SF 10033.

Plaster

Methodology

The plaster was analysed in terms of quantity, range and variety, condition, provenance and date-range. All fragments were examined microscopically at $\times 20$ magnification (many 'white' plaster fragments actually bore small surviving patches of painted decoration or faint washes/traces of colour, which were not clear when examined macroscopically). Despite this, it is still possible that many of the fragments described as 'white' originally bore painted decoration, which has subsequently worn off.

The assemblage was quantified by fragment count and weight (in grammes) and measurements (in mm) were taken of any complete dimensions. Due to the fragmentary nature of the assemblage, it was decided not to measure the area covered (Ling 1989, 88). The thickness of the fine plaster layer (or *intonaco*), and the mortar backing (or *arriccio*) were recorded, as were part, colour/decoration and

condition. Small find numbers were assigned to fragments exhibiting clear decorative schemes/motifs, and atypical or unusual features and forms.

Terminology for the thickness of painted lines and areas is derived from Davey and Ling (1982, 81), in which a 'stripe' is 5–20 mm wide, a 'line' is narrower than a 'stripe', a band is 20–200 mm wide and a 'zone' is wider than a 'band'.

In describing the plaster, the following definitions have been used

- Arriccio* : a thick undercoat or levelling coat of lime mortar; contains filler (usually sand) – to prevent cracking of thickly applied material, and often an aggregate (e.g. river gravel); the thicker the mortar, the coarser the filler (eg pebbles); sand was used for layers of less than a few centimetres; fibrous organic material (eg hay, grass, straw) was sometimes added as a filler to provide strength and binding properties (Davey and Ling 1982, 54; Ling 1989, 88).
- Intonaco*: the finishing plaster; a surface layer of fine, usually white, lime plaster, to which any painted decoration was applied (Davey and Ling 1982, 55).

Quantity

The site produced a total assemblage of 540 fragments (4,752 g) of Roman plaster of which Roman phases produced 441 fragments (2,420 g) (81.7 % by fragment count and 50.9 % by weight of the total assemblage).

Range and variety

Few diagnostic features were recovered; the plaster comprises mainly middle fragments with few possible edge or corner pieces. The remaining 117 fragments (415 g) comprise indeterminate pieces of mortar, most of which are probably *arriccio* fragments from wall or ceiling plaster.

Most fragments have clear brush marks in the plaster surface, sometimes also in the paint surface. Most are roughly parallel and are probably vertical strokes. There are a few pieces with multi-directional brush marks, which are more commonly seen in ceiling plaster. Most of these were retrieved from (753), the demolition deposit of the Phase 7 shrine.

A small number of fragments provide evidence of re-decoration, although none bears more than two layers of painted plaster. Some fragments have an intervening layer of mortar (*arriccio*) between the two coats of fine plaster (*intonaco*); in others, a second *intonaco* layer has been laid directly over the first.

There are very few fragments with hydraulic, *opus signinum*-type, mortar (*arriccio*); most have a lime-mortar backing with sand, pieces of lime, voids, coal, impressions of hay/straw and rare inclusions of other materials (eg a tiny

fragment of painted wall plaster, a tiny sherd/chip of samian ware and pieces of crystalline calcite). A small proportion of fragments still retain surviving pieces of hay/straw. Most fragments of plaster have an *intonaco* layer with very few inclusions (eg rare sand grains). However, 43 fragments (1,028 g) contain moderate to abundant inclusions of crystalline calcite. Crystalline calcite added to the *intonaco* layer has previously been noted in painted wall plaster recovered from buildings in the western *canabae* (Heke 2012b, 106; Carrington and Heke, 2012b, 167). There are also rare examples with a polished surface. These forms of decoration sometimes appear in combination.

Colour range

A range of colours was used to decorate the plaster, although many appear patchy and abraded. Together with the small size of the fragments, this has made it difficult to distinguish any definite patterns or designs. Most colours occur on their own, appearing in combination with other colours on just 23 fragments (250 g) (Table 85). In terms of weight, shades of yellow (23.0 % by weight) are the most common colour, followed by shades of grey to black (6.8 % by weight) and shades of red (4.3 % by weight). Plain white fragments make up 8.6 % by weight of the assemblage. Indeterminate fragments (*arriccio* only) comprise 28.2 % by weight of the total.

The most popular colours in combination are shades of yellow and grey/black (3.7 % by weight of the total

assemblage). Three adjoining fragments (45 g), combining red, pink and blue-green comprise 0.9 % by weight of the total, with yellow and red in combination just 0.02 %. Blue-green on its own also comprises just 0.02 % by weight of the total assemblage.

The main pigments available in Roman Britain (eg red and yellow ochre, green earth, chalk-based white, black from soot or charcoal and blue from blue frit) could all have been obtained from local sources and so were relatively inexpensive (Ling 1985, 54–5). The colours used to decorate the walls of the arena, the *Nemesseum*, and the shrine which abutted the outer wall of Amphitheatre 1b, are consistent with those used elsewhere in Chester, in both the fortress (Newstead and Droop 1931, 139; Newstead and Droop 1939, 37; Davey and Ling 1982, 96–7; Liversidge 1983, 141–4) and *canabae* (Carrington 2012; Heke 2012b; Carrington and Heke 2012a; 2012b; Carrington 2012d; Dunn 2012). Analyses of wall painting fragments from provincial domestic architecture has shown that the pigments in common use were red and yellow ochres, Egyptian blue (a calcium copper silicate), soot and carbon-based blacks, green earths, chalk-based white and mixtures of these colours (Siddall 2006, 28). The use of colour reflected a hierarchy of status, with white the least valued, shades of red and yellow of medium status and blue and black restricted to the very best rooms. There was also an increasing dominance of lower status white ground decoration from the end of the 2nd century onwards (Perring 2002, 124).

Table 85 Colour range of Roman plaster by quantity and Area.

(*excludes fragments with two or more layers of plaster/decoration (27/1,128 g))

Description	A (Roman)		B (Roman)		A (PR)		B (PR)		Total	
	No	wt (g)	No	Wt(g)	No	Wt(g)	No	Wt(g)	No	Wt(g)
Yellow	42	315	13	191	10	145	3	11	68	662
Pale yellow	18	61	5	18	5	65	5	102	33	246
Cream-yellow	20	136	8	36	1	10	1	3	30	185
Red	53	143	0	0	2	60	0	0	55	203
Grey	44	170	3	11	0	0	4	42	51	223
Pale grey	0	0	21	71	1	2	3	25	25	98
Black	0	0	3	4	0	0	0	0	3	4
Blue-green	1	1	0	0	0	0	0	0	1	1
Plain white	45	214	4	9	10	187	1	1	60	411
Yellow + grey	9	83	5	79	0	0	2	14	16	176
Yellow + red	1	1	0	0	0	0	0	0	1	1
Red + pink + blue-green	3	45	0	0	0	0	0	0	3	45
Black + yellow	0	0	2	6	0	0	1	22	3	28
Indet (<i>arriccio</i> only)	118	744	5	16	2	408	39	173	164	1341
Total	354	1913	69	441	31	877	59	393	513	3624
<i>Redecorated frags*</i>	19	71	0	0	2	58	6	999	27	1128
Total									540	4752

Energy Dispersive X-ray Fluorescence (ED XRF) analysis, carried out by David Dungworth, on three fragments of painted plaster from (738) and (753), collapse deposits associated with the Phase 7 shrine, revealed that the red and yellow were probably formed using iron compounds (red and yellow ochre). The grey was uncertain; although soot was probably used, this cannot be detected using ED XRF.

Apart from the pigments used for the paints, the sources of the raw materials used in the production of the painted plaster would have been identical to those employed in the production of the various concretes and mortars used for building work at the site. Water was readily available, as were the aggregates and fillers used in the *arriccio* layers. River gravels, sand and crushed ceramic building material were easily obtainable in the local area. The presence of local red sand in the mortar backing is attested by the fact that the sandier the mortar, the pinker it appears to be.

Most of the plaster probably derives from simple, two-dimensional, panel schemes, the most common form of decoration in Roman Britain, which occurs at all periods. It is also the only type of wall painting so far known in Britain before the mid-second century (Ling 1985, 21–2).

Phases 5–7

Amphitheatre 1a: Phase 5

The material dumped on the north-west side of Amphitheatre 1a contains painted plaster as well as other forms of building material (above). Fragments include mostly plain white and patchy yellow painted surfaces. Some of the latter have added inclusions of crystalline calcite in the *intonaco* layer. There were also fragments with a fine, hard, red painted surface and again with abundant crystalline calcite in the *intonaco* layer. Several pieces have multi-directional brush marks in the plaster surface (sometimes indicative of ceiling plaster) and traces of polishing. Both of these features are regularly seen in high-quality work. Some red painted fragments appear to have been painted in true fresco style, as the paint is bonded to the *intonaco* layer. This is also a feature of high quality work.

Amphitheatre 1b: Phase 6

The seating bank deposits of Amphitheatre 1b, which consisted of material imported from elsewhere included plaster as well as other building materials. Again, plain white fragments and patchy yellow paint were present. Colours in combination comprised pale yellow and grey (including a black or dark grey stripe/band/zone adjacent to a patchy, pale yellow, stripe/band/zone), with patchy, indistinct coverage and scheme of decoration, and one fragment with a black edge on a white ground. Colours on their own comprise yellow, pale yellow, cream-yellow, pale grey and plain white. Some of the yellow painted plaster contained crystalline calcite in the *intonaco* layer and a small quantity had polished surfaces. A single pale grey fragment has two layers of mortar, the lower

being sandier and coarser than the upper layer. A single fragment/14 g decorated with cream/yellow paint with a darker yellow patch, also has traces of fine plaster attached to the underside of the *arriccio* layer, indicating at least two phases of decoration.

Amphitheatre 1b: Phase 7

There were scattered fragments within the sands and other deposits deposited around the walls of Amphitheatre 1b in Area A, but the majority of the material came from the probable shrine structure.

Plaster was found still adhering to the inner face of the sandstone wall (739) of the stone phase of the shrine (Fig 131). The plaster on the bottom two courses (751) was coloured red/white/black/orange/blue with one fragment bearing evidence of red and white patterning. White creamy plaster was also found attached to one of three sandstone blocks. The plaster on the bottom two courses survived to a height of 0.25 m and is described as having ‘no real thickness’. Walls of building were usually divided into three superimposed zones, the lower dado, the central main zone and the upper zone or frieze (Ling 1985, 16). It is unclear how closely the decoration of this small structure would follow this convention. If so, the plaster adhering to the bottom two courses would be from the dado, which was generally 30–90 cm in height (Ling 1985, 22). It is probable that the fragment described as bearing ‘red and white patterning’ equates to Cat no 33.

Following its disuse, the collapse deposits within the shrine, (753) and (738) produced 230 fragments (1,129 g) of painted plaster. The predominant colour is yellow, in shades ranging from cream/pale yellow, through pale yellow to yellow. They include a possible corner fragment with a curved surface and a corner or edge fragment. There is also a possible edge fragment with a yellow stripe/band/zone adjacent to plain white. The next most common colour is grey (17 fragments (70 g)), which occurs as a band/zone of colour, occasionally adjacent to yellow. One yellow, and one pale yellow and grey fragment have two layers of mortar, the lower layer being much coarser, sandier and pinker than the upper one.

Shades of red are also common amongst this group. Some fade from red to pink in colour, although this may be due to bleaching rather than deliberate shading by the addition of white paint. Three adjoining fragments (Cat no 33) provide evidence of a simple linear scheme. This comprises a red band/zone on a white ground divided by a pink stripe, a red stripe and a pink line. Originally this was adjacent to a blue-green band/zone which was later over-plastered in plain white, leaving just the red/pink part of the scheme exposed. The material suggests an initial scheme with a plain blue-green band/zone, over-plastered in pale yellow adjacent to plain white. A further piece (Cat No 34) has a clearly deliberate colour change with a red stripe/band/zone adjacent to a pink stripe/band/zone.

Twenty-one fragments provide evidence that the shrine

underwent at least one phase of re-decoration, as all bear two layers of fine plaster. On only three fragments are the two layers of *intonaco* separated by a layer of mortar (they do not adjoin but probably from the same scheme). On these three fragments, the lower layer is painted in a band/zone of blue-green; the second layer is painted yellow. This patchy upper layer may also have been polished. If so, this provides the only evidence for fine-quality work amongst the plaster assemblage from the shrine. The intervening *arriccio* layer also contains rare fragments of crushed ceramic building material, unlike the lower layer of mortar.

The surviving plaster assemblage suggests that the shrine was probably painted using a simple panel scheme and that the structure was re-decorated at least once during its lifetime. It is notable that none of the fragments from the shrine contain crystalline calcite in the *intonaco* layer.

Catalogue

- 33 Painted wall plaster; three adjoining fragments with multi-directional brush marks in plaster surface; partially re-decorated: white ground with red band/zone divided by pink stripe, red stripe and pink line; blue/green band/zone later over-plastered in white, leaving just the pink/red area exposed; sandy mortar with moderate lime and voids, occasional mica and rare coal; Th *arriccio*: 21 mm; Th *intonaco*: 0.5 mm. A (753): Phase 7 collapse deposit; SF 9976. Fig 328.
- 34 Painted wall plaster; vertical brush marks in paint surface; red stripe/band/zone adjacent to pink stripe/band/zone; sandy mortar with occasional lime and gravel. Th *arriccio*: >8 mm; Th *intonaco*: 0.5 mm. A (753): Phase 7 collapse deposit; SF 9977.

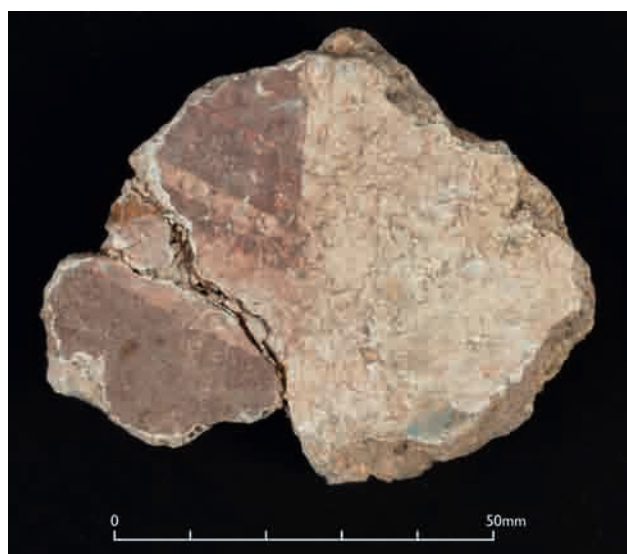


Fig 328 Building materials: Painted wall plaster, BM Cat no 33.

The arena wall and Nemeseum

Additional information on the material recovered from excavations carried out between 1929 and 1969 is from an unpublished assessment of the records and finds held by the Grosvenor Museum, undertaken by Gillian Dunn and Rebecca Wegiel in 2003–04, and also from microscopic examination by the author of the fragments retained.

In 1929–31 excavations revealed that the wall plaster from the arena wall had largely fallen away, but in one area (Section 3), two patches were found *in situ*, forming a thin coat over the joints of the masonry. Some detached fragments of keyed plaster were also found below these areas. The plaster comprised ‘a single rendering of mortar’ with ‘definite traces of colour wash’ which was ‘best preserved on those blocks of stone which ... were lying face downwards on the floor of the arena ...’ (Newstead and Droop 1932a, 18). Three main colours were identified: a dark ‘Venetian’ red, shading to light red and orange-red; yellow shading to orange-yellow; and plain white. In places, these colours had been blended together to produce a marbled effect. A small patch of dark green was preserved on the face of one block, but was not found elsewhere. In other areas, superimposed layers of paint could be seen on some sections of plaster, but much of the colour was applied after the plaster had fallen away as, in many places, it completely covered the faces and edges of the bedding surface of the stones.

Seven fragments of painted wall plaster, presumably from the arena wall, were retained from excavations at the amphitheatre in 1930. They comprise a single edge fragment and six middle fragments. Microscopic examination of one piece revealed an *arriccio* layer of sandy lime mortar (Th: *c* 18 mm) and a thin *intonaco* layer (Th: *c* 1 mm) decorated with a band/zone of well-preserved dark red paint. Three other fragments bear patchy traces of red to orange/red paint. All have an *arriccio* layer of sandy lime mortar, with abundant sand, common lime and occasional voids, which ranges in thickness from >15–23 mm. The *intonaco* layer ranges in thickness from 0.5–2 mm. Two adjoining fragments, with an *arriccio* layer of sandy lime mortar (Th: >30 mm), also of abundant sand, common lime and occasional voids, are decorated with a band/zone of grey/green paint against a stripe/band/zone of orange/red paint. The *intonaco* layer has a thickness of just 0.5 mm. The final piece is decorated with an indistinct design of patchy orange/red, yellow and grey-green paint. It has a thin *intonaco* layer (Th: 0.5 mm) and an *arriccio* layer (Th: *c* 12 mm) of sandy lime mortar, which is similar in composition to the other pieces, but with the addition of rare impressions of hay/straw.

Thompson noted two distinct types of plaster rendering on the face of the arena wall, traces of which were discovered at many points, although he did not find the range of colours noted by Newstead. (1) a primary coat of hard white lime plaster, less than 1.5 mm in thickness, the surface of which was painted a dark reddish brown.

There were at least two coats, both painted the same shade of reddish brown. The coats were too thin to level up the irregular surface of the masonry but provided a hard, consistent base for the application of the paint; (2) a much thicker rendering of 'lime and sand', approximately 25.4 mm in thickness and quite coarse in texture, was applied over the earlier coats, giving a plain, smooth surface. The surface was worn away, leaving no evidence either of its finish or its possible colouring (Thompson 1976, 144 and 146).

Twenty-three fragments of painted wall plaster plus three fragments of *arriccio* were recovered from excavations at the site in 1966, all from a black-brown loam which filled the chamber of the *Nemeseum*. They comprise a range of colours and designs, the latter including probable floral motifs, represented by curved lines (possibly leaves and other foliage) in green, grey/brown and red. Bands/zones of colours comprise shades of red, yellow, green, grey/black and plain white. It is possible that these represent coloured decoration within the *Nemeseum*.

4.2 ENVIRONMENTAL STUDIES

ARCHAEOBOTANICAL SAMPLES: ROMAN PHASES

By Ruth Pelling

Introduction

A total of 210 samples was processed and assessed from features associated with the Roman amphitheatre. The largest number of samples recovered was from contexts associated with the construction of Amphitheatre 1a (Phase 4), and the construction and use of Amphitheatre 1b (Phases 6–7) (for data see Appendix 6). Other samples were taken from the early medieval re-use of the arena of the amphitheatre (Phase 10) and robbing deposits (Phase 11), which are discussed in Volume 2 of this report. Only a limited number of features producing archaeobotanical material were associated with the use of Amphitheatre 1a (Phase 5) and the construction and use of Amphitheatre 2 (Phases 8–9), meaning that fewer samples were available for study from these phases. Iron Age archaeobotanical results are discussed in Part 2.

The sampling was intended to retrieve plants and other biological remains and finds associated with the construction and use of the amphitheatre, as well as post-use development of the arena. Of particular interest was the potential for the recovery of snack foods, imported or newly introduced plant foods, as well as the investigation of the character of farming activity within the surrounding area.

Sample Selection

The selection of samples for analysis was informed by an initial assessment of all samples (Campbell 2010). The Roman period flots were of varying sizes. Some large flots were dominated by charcoal, while in the late phases (particularly during the robbing Phase 11b, see volume 2) large quantities of ‘clinker’-like material and coal were present. Charred cereal grain and chaff, weed seeds and other plant remains were present in low numbers (the assessment identified only 5 samples likely to contain more than 25 quantifiable seeds or chaff items). Mineral-replaced remains and uncharred seeds with high lignin content were abundant in a small number of samples. Fourteen samples were selected for full quantification and analysis. Samples were selected from those which were noted to contain the greatest number of quantifiable plant remains during assessment, although in all but two samples the total

number of charred seeds or chaff numbered fewer than 50. While the total number of items per sample was relatively modest, the paucity of published archaeobotanical data from Chester and its vicinity is such that it was thought that analysis was worthwhile.

Results

Preservation

The majority of the plant material in the Roman phases was preserved by charring. A number of seeds, particularly of the fruits of bramble/raspberry (*Rubus* sp), elderberry (*Sambucus nigra*) and fig (*Ficus carica*) were not charred. These fruits produce seeds which have a high lignin content and impermeable seed coats making them resistant to decay (McCobb *et al* 2001). In some cases the seeds had been entirely replaced by calcium phosphate, characteristic of seeds or other plant material buried in a deposit in which high levels of mineral compounds are mobilised by liquid, typically in cess-pits or sewage deposits. A range of preservation types were noted from ‘fresh’ looking, where decay has been minimal, to fully mineral replaced. The presence of mineralised seeds of fruits likely to have been eaten by humans (particularly figs) can be used to infer human sewage.

Amphitheatre 1a (Phases 4 and 5)

Only one sample (sample <4783> (1216)) of those taken from features associated with Amphitheatre 1 produced any charred plant remains other than charcoal. This came from the fill of the cess-pit (1256) (p 85). The charred remains recovered from sample <4783> consisted of a mix of charred cereal grain, chaff (two glume bases) and seeds of ruderal, waste or other disturbed habitats (*Chenopodium album* (fat hen), *Polygonum aviculare* (knotgrass), *Malva* sp (mallow), *Plantago lanceolata/media* (plantain)), grassland (cf *Potentilla* sp (cinquefoils), small seeded leguminous taxa), or wet ground taxa (*Eleocharis palustris* (spikerush), and *Carex* species (sedges)). A single seed of blackberry/bramble (*Rubus subsect gladulosus*) was not charred, possibly surviving unaltered due to the tough seed coat or somewhat anaerobic conditions. Cereals identified included both hulled barley (*Hordeum vulgare*) and hulled emmer or spelt wheat (*Triticum dicoccum/spelta*). An identifiable glume base confirmed the presence of spelt wheat (*Triticum spelta*). Charcoal was abundant, and was dominated by oak (*Quercus* sp) with some diffuse porous types which were not identified.

At least some of the oak charcoal in this deposit (also noted in sample <4784>, of the same context, but not analysed), may be associated with construction activities. Though it is possible that the cereal remains and weed seeds represented residual scatters of material from earlier arable activity on the site, the presence of this material is consistent with the varied refuse used to fill this pit.

Amphitheatre 1b (Phases 6 and 7)

These were the best represented phases of amphitheatre construction and use in terms of plant remains, with 17 samples containing some material, derived from deposits associated with re-deposited construction material (Phase 6) and a post-hole (Phase 7). Six samples were fully quantified (five from Phase 6 and one from the Phase 7 post-hole). The samples produced a mix of cereal grains, chaff (glume bases) and seeds of wild taxa. Cereals identified were hulled barley and hulled wheat including glume bases and spikelet forks identified as emmer (*Triticum dicoccum*).

Wild taxa in the Phase 6 samples included plants of ruderal/waste ground, some of which may have occurred as arable weeds (*Fallopia convolvulus* (black bindweed), *Chenopodium album*, *Polygonum lapathifolia* (pale persicaria), *Odontites/Euphrasia* (bartsia/eyebright)). Occasional leguminous taxa, which may occur within grassland or arable field margins, or in waste places within the settlement, were also recorded. A small number of seeds of wet ground taxa was present in sample <3432>, taken from a deposit of seating bank material (context 2498), which included a *Juncus* (rush) capsule, *Eleocharis palustris* and *Carex* seeds. The seating banks appear to have been constructed from a mix of material gathered locally which includes demolished building debris such as hypocaust and roof tiles (p 211). The incorporated charred plant material might include burnt dung or stable waste, flooring material or riverside vegetation, possibly from a range of waste deposits within the vicinity. Occasional seeds of *Rubus* sp (raspberry, bramble) could have been growing on the site. Such material may originate from earlier phases of activity at the site, having been re-deposited within the construction layers. Wild taxa were limited to a single indeterminate seed in the Phase 7 sample.

Amphitheatre 2 (Phases 8 and 9)

Only two samples were available from Phase 8, one of which (sample <4154>, (678)) produced uncharred seeds of fig (*Ficus carica*). Charcoal and other charred plant remains were very limited and the samples were not examined beyond assessment level. Five samples were available from Phase 9, of which two were fully analysed; the remainder produced only limited charred seeds, although large amounts of well preserved charcoal and some tubers were noted in sample <4682>(978), a base-plate cast in radial timber frame 12. The two analysed samples were taken from pit (803), situated outside the Amphitheatre (samples <4640>and <4641>, from (895 and 897)).

Both Phase 9 samples were characterised by the seeds of edible fruits which had been preserved by calcium phosphate mineralisation or survival due to the tough lignin content of the seed-coat. Sample <4640> produced a large number of fig seeds, several of which were fully mineralised (these seeds were hard). Fig can be particularly characteristic of human sewage deposits. A small number of charred fig seeds suggest some burning of waste which may have included either fruits of fig or human faeces. A small number of blackberry seeds in the same deposit may also be derived from sewage, while the occasional seeds of uncharred sedges may derive from vegetation growing around or within the pit, or cut material discarded into the pit or potentially remains of animal dung. Charred grain of indeterminate wheat, hulled barley and oats in the samples must derive from background scatters of cereal remains. Sample <4641> also produced fig seeds, but was characterised by a larger number of seeds of bramble. None of the bramble seeds had been fully mineralised, and all were soft but woody. Both phase 9 deposits may be related to the disposal of human sewage in the pit and reflect the consumption of figs and blackberry. The single seed of uncharred duckweed (*Lemna* sp) is interesting as it implies either the presence of standing water in the pit, at least seasonally, or that it was introduced attached to sedges.

Discussion

In contrast to the Iron Age deposits (pp 47–56), samples from Roman phases associated with the amphitheatre at Chester have produced only limited charred plant remains other than charcoal. The abundance of oak charcoal noted in the samples may be associated with construction activities, including scaffolding, but could also be derived from the structure of the amphitheatre itself. The paucity of cereal remains and associated impurities (occasional chaff items and weed seeds) can be interpreted as relating to the feature types and the expected lack of cereal processing or storage in and around the amphitheatre. The low density and poor preservation of remains that are present is such that it is possible much of the cereal material represents reworked remains from the Iron Age settlement where the evidence for cereal storage and processing is strong, or scattered remains from burning of stable waste and other rubbish. Given the low density of remains and the potential for reworked material it is not possible to interpret the cereal remains with any certainty. Barley is likely to have been utilised throughout the Iron Age, Roman and medieval periods. Emmer and spelt are likely to have been cultivated locally throughout the Iron Age and Roman periods (emmer may have been a secondary crop or a contaminant of the spelt crop).

The wild flora represented includes a small number of arable weeds which may have been introduced to the site with cereal remains. Again, given the potential for

intrusion it is difficult to extrapolate habitat requirements of taxa represented within deposits associated with Roman period activity. Many of the seeds of ruderal plants with catholic habitat requirements may have been growing within the amphitheatre area, or may have been harvested with cereal crops. The fact that the seeds are all charred suggests they were burnt with domestic or cereal processing waste, although fires associated with the construction of the amphitheatre are also possible.

Damp ground taxa, present throughout the phases, are likely to have been locally derived. Rushes and sedges may have been deliberately cut for use as flooring, to dampen down the smell of cess-pits, or for animal bedding or thatching, or may have arrived in dung and subsequently been burnt with stable waste.

Potential snack foods were not well represented in the samples although the abundance of mineralised or unaltered fig and *Rubus* seeds in the deposits associated with use of the second amphitheatre do suggest the consumption of these fruits. Figs are most likely to have been imported; while figs will produce fruits in Britain it is unlikely they would produce a reliable crop as far north as Chester. *Rubus* species are likely to have grown locally. Given the presence of likely imported fig, the absence of grape (*Vitis vinifera*)

is of some interest, although fig is the most ubiquitous of all imports in Roman Britain occurring on more sites than grapes (van der Veen *et al* 2008). It is possible that this is a reflection of recovery rather than absence of consumption, given the large number of seeds produced by figs compared to grape, although this may also reflect the popularity of dried fig and the scale of imports.

Conclusions

Archaeobotanical samples from deposits associated with the construction and use of the Roman amphitheatre in Chester have produced small quantities of charred plant remains, much of which are likely to be derived from residual or intrusive material, or scatters of burned dung or stable waste. Seeds preserved by full or partial calcium phosphate mineral replacement provide some indication of fruits consumed by visitors to the amphitheatre, notably fig and probably raspberry or blackberry, although the range of snack and imported plant foods was small. Evidence for consumption of possible snack foods was much stronger in the bone evidence with a high proportion of domestic fowl relative to mammal bones recovered from the area surrounding the first amphitheatre (pp 409–10).

MAMMAL, BIRD AND AMPHIBIAN BONE FROM ROMAN PHASES

by Peter Popkin

Introduction

Two groups of contexts contained sufficient faunal remains for analysis: contexts in Area A related to the use of Amphitheatre 1 in Phases 5 to 7, and the seating bank dumps of Phase 6 in Area B. These groups differ, in that the material from Area A in Phase 7, and less certainly in Phase 5, relates directly to activities that took place outside the amphitheatre while the Area B dumps represent material used by occupants of either the legionary fortress or the civilian population of the *canabae*, that was subsequently redeposited on the amphitheatre site. This redeposition occurred within a narrow date range associated with the alteration of the first amphitheatre and represents material accumulated during the early occupation of the legionary fortress and *canabae*. One of the principal goals of this analysis has been to compare the assemblages deriving from Areas A and B to test the difference between animal use and deposition associated with the amphitheatre itself (Area A) and the surrounding area (Area B). To this end, much of the analysis is based at the level of an area, rather than the level of context. Fortunately, the areas are relatively small and the phases under consideration are all tightly dated so this level of analysis provides excellent resolution and datasets of a useful size. Faunal material from both the fortress (Cartledge 1991) and *canabae* (Baxter 2009) are compared with the amphitheatre remains when possible.

Within Area A faunal remains were recovered from Phases 3–9 and the robber trenches of Phase 11, which have been shown to contain virtually exclusively residual Roman finds material. Faunal remains are limited to Phases 6 and 11 in Area B. Phases 3, 4, 8, 9 in Area A and the robbing Phase 11 in both areas. Each contained fewer than 100 mammal bones so do not feature in most of the analyses.

Methodology

All of the faunal remains were identified and recorded by Ian Smith who conducted the initial assessment. The following methods were used by Smith. Where alternative methods were deemed necessary during analysis they are specified.

The faunal remains were recovered through a combination of hand-collection and sieving following English

Heritage protocol (Campbell *et al* 2011). Sampling and subsequent wet sieving and flotation, were sufficient to secure a representative collection of small mammal, bird and amphibian bones.

Whenever possible, identification was accomplished with the aid of the Chester Archaeology faunal reference collection. Other reference collections consulted include the Natural History Museum in Tring (for birds), the Natural History Museum in London (for mammals) and English Heritage at Fort Cumberland (for birds, small mammals and amphibians). Reference texts consulted include Boessneck (1969), Payne (1985) and Prummel and Frisch (1986) for sheep and goat; Lister (1996) for deer; Davis (1980) for equids; Bacher (1967), Baumel (1979), Cohen and Serjeantson (1996) and Gilbert *et al* (1981) for birds; Böhme (1977) and Glastra (1980) for amphibians. Fragments that could not be assigned a taxon were identified as large or medium mammal.

The zones recorded for mammal bones are defined in Table 86. These zones were counted when at least 50 % of the zone was present. Bird zones are recorded following Cohen and Serjeantson (1996). Minimum number of animal Anatomical Units (MAU) (ref) was calculated for the main domestic animals. Numbers of Identified Specimens (NISP) are counted for small mammals and amphibians without assigning zones. Tooth wear stages were recorded following Payne (1973, 1987) and suggested ages assigned according to his tooth wear and eruption categories. Epiphyseal fusion data were assigned ages based on Zeder (2006) for sheep and goat, and Silver (1969) for other common species. Pig canines were sexed following Schmid (1972). Measurements of mammals were taken following von den Driesch (1976). Bird measurements were taken following Cohen and Serjeantson (1996). Withers heights were calculated following Matolcsi (1970) for cattle and Teichert (1975) for sheep. Measurements of all species are given in Appendix 7. Butchery was recorded using Lauwerier's (1988) codes with the addition of codes by Ian Smith. All new codes are defined and described in Table 87.

Mammals

A total of 2,555 mammal bones were identified as belonging to securely dated Roman phases (Tables 88, 89). The majority of mammal bones recovered belong to the three main domesticates: cattle, sheep and pig. Most sheep and goat bones could not be distinguished to species so were

Table 86 Mammal bone zone recording definitions.

Element	Zone	Definition
horncore/antler	1	base
horncore	8	tip
cranium	1	occipital condyles
maxilla	1	M1 in socket
	2	M2 in socket
	3	M3 in socket
	.4.	d4 in socket
	4	P4 in socket
	6	posterior of maxillary tooth row
	7	anterior of maxillary premolar and molar tooth row
	9	M1/M2
		in pigs count the gap between P1 and P2
mandible	1	M1 loose or in socket
	2	M2 loose or in socket
	3	M3 loose or in socket
	.4.	d4 loose or in socket
	4	P4 loose or in socket
	5	mandibular condyle
	6	anterior ascending dorsal ramus must including area immediately posterior to final molar
	7	diastema area anterior to P2
	8	(mandibular) canines of pigs loose or in socket, must include robust central part not just root or tip
	9	M1/M2
atlas	1	posterior articular surface (left)
	2	posterior articular surface (right)
axis	1	anterior articular surface (left)
	2	anterior articular surface (right)
scapula	1	caudal angle of blade
	2	dorsal/proximal end of spinous process
	4	tuber of spine/mid spinous process
	5	base of spinous process (distal end)
	.6.	supraglenoid metaphysis
	7	glenoid
	8	supraglenoid tubercle
	9	posterior of neck with foramen
humerus	1	head
	2	greater tubercle
	.3.	proximal metaphysis
	4	deltoid tuberosity
	5	olecranon fossa
	.6.	distal metaphysis
	7	trochlea (medial articulation)
	8	capitulum (lateral articulation)
	9	coronoid fossa
radius	1	medial half of proximal epiphysis
	2	lateral half of proximal epiphysis
	.3.	proximal metaphysis
	4	posterior proximal ulna scar and foramen
	5	distal part of diaphysis
	.6.	distal metaphysis
	7	medial half of distal epiphysis
	8	lateral half of distal epiphysis
ulna	1	olecranon
	.3.	proximal metaphysis
	4	trochlear notch semilunaris
	8	lateral coronoid process

Table 86 (continued) Mammal bone zone recording definitions.

Element	Zone	Definition
sacrum	1	anterior (articular) surface of body of 1st sacral vertebra (left half)
	2	anterior (articular) surface of body of 1st sacral vertebra (right)
pelvis	1	auricular surface rough "scarred" area
	2	body of ilium (with dorso-medial foramen in cattle and pig and caprovid)
	.3.	unfused ilium portion of acetabulum
	4	ilium portion of acetabulum
	5	ischium portion of acetabulum
	.6.	unfused ischium portion of acetabulum
	7	symphyseal branch of pubis
	8	ischial tuberosity
	9	pubic portion of acetabulum
	.9.	unfused pubic portion of acetabulum
femur	1	head
	2	greater trochanter
	.3.	proximal metaphysis
	4	lesser trochanter
	.4.	unfused lesser trochanter
	5	supracondyloid fossa
	.6.	distal metaphysis
	7	medial distal condyle
	8	lateral distal condyle
	9	trochlea
	.9.	unfused trochlea
tibia	1	proximal medial condyle
	2	proximal lateral condyle
	.3.	proximal metaphysis
	4	proximal posterior nutrient foramen
	5	distal part of diaphysis
	.6.	distal metaphysis
	7	medial half of distal epiphysis
	8	lateral half of distal epiphysis
astragalus	1	must include proximal medial quarter
calcaneus	1	calcaneal tuber
	.3.	calcaneal metaphysis
	4	sustentaculum tali
	8	distal process
metacarpal/MT	1	medial facet of proximal articulation (or MC/T III)
	2	lateral facet of proximal articulation (or MC/T IV)
	.3.	unfused laterally
	4	midshaft (SD) area
	5	anterior distal groove and foramen
	.6.	distal metaphysis (for ungulates lateral and medial counts as 1, lateral only counts as 0.5)
	7	medial distal condyle
	.7.	unfused medial condyle
	8	lateral distal condyle
	9	unsided distal condyle (just one)
	.9.	unfused unsided distal condyle
1st phalanx	1	proximal articulation
	.3.	metaphysis
2nd phalanx	1	proximal articulation
	.3.	metaphysis
3rd phalanx	1	proximal articulation

Table 87 Butchery codes added to Lauwerier code system; bones in order of appearance in Laurwerier.

Element	Code	Location or Type
all	a	hack mark
all	b	hacked right through
all	c	cut mark
all	d	shave mark
all	e	sawn
all	f	perforated or hook mark
all	g	broken through, possibly hacked
cranium	13	skull halved, divided into left and right halves through the median plane
cranium	14	parallel with and above the maxillary row
cranium	15	between the tooth row and the palatal suture
cranium	16	just posterior to the maxillary tooth row
cranium	17	hacking through the maxillary molars (M1 M2 or M3)
cranium	18	hacking through the maxillary premolars
cranium	19	at the anterior end of the premaxilla in an approximately lateral to medial direction
horn-core	9	hacking or cutting from aboral direction
mandible	35	divided below the level of the tooth row (divides the horizontal ramus into dorsal (toothed) and ventral parts)
atlas	20	transverse marks or division across the cranial end from the dorsal aspect
atlas	21	transverse mark on the ventral facing part of the anterior articular surface (results from a cut or hack from ventral)
atlas	22	transverse mark anterior of the ventral tubercle
vertebra	20	divided into left and right halves through the median plane
vertebra	21	transverse marks (or division) across the anterior end from the ventral aspect
vertebra	22	transverse marks (or division) mid centrum from ventral
vertebra	23	transverse marks (or division) across the posterior end from the ventral aspect
vertebra	24	vertical division (or marks) through the arch and typically removing a lateral part of the vertebral centrum
vertebra	25	horizontal marks that divide the "arch" (similar to Lauwerier 13 but more ventral)
vertebra	26	horizontal marks circa midway down the spinous process
rib	8	approximately transverse marks affecting the waisted (dorsal half) of a typical rib (rib with costal grooves)
rib	9	approximately transverse marks affecting the flat ventral part of a typical rib
rib	10	most dorsal part hacked off but collum costa still intact
rib	11	longitudinal hacking or other marks
scapula	31b	in my records 31b is the same as Lauwerier 31 (and I have not used 31b to indicate the hacking through the neck as in Baxter)
scapula	41	diagonal blade division from posterior angle to "neck"
scapula	42	across the "neck" from medial/cranial
scapula	43	across the "neck" on the thoracic/posterior side
scapula	44	longitudinal marks across the lateral surface of the blade approximately parallel with the cervical border and running from dorsal to ventral
humerus	39	longitudinal cranial/caudal division created by hacking
humerus	40	distal lateral angle of capitulum hacked off
humerus	41	longitudinal medial/lateral divisions (may be associated with 34)
ulna	16	division or marks across the proximal end dividing the olecranon from the articular part through the "neck" that separates them
ulna	17	hacking or shave marks running along the posterior border of the shaft

Table 87 (continued) Butchery codes added to Lauwerier code system; bones in order of appearance in Laurwerier.

Element	Code	Location or Type
ulna	18	hacking that isolates the processus anconeus (or "beak")
radius	35	medial/lateral division running from proximal to distal
radius	36	dorsal/ventral division running from proximal to distal
metapodial	32	longitudinal splitting along the anterior/posterior axis
pelvis	30	adjacent to and parallel with the pubic symphysis
pelvis	31	across the ischiatic spine
pelvis	32	on the the dorso-medial side of the neck of the ilium
femur	37	hacking affecting the lesser trochanter
femur	38	transverse division or other marks across the extreme distal shaft and most proximal parts of one or more distal condyles
tibia	39	transverse division across proximal shaft
tibia	40	medial part of proximal articulation
tibia	41	proximal shaft fragments split longitudinally (may be assoc with 2, 3, 4 but also found without prox articulation)
tibia	42	transverse division across distal shaft
calcaneus	20	coracoid process hacked through in longitudinal direction (ie parallel with the long axis of the bone)

Table 88 Roman mammal NISP.

Animal/Phase	A 3	A 4	A 5	A 6	B 6	A 7	A 8	A 9
Cattle (<i>Bos taurus</i>)	25	14	413	43	234	167	20	31
Pig (<i>Sus domesticus</i>)	8	4	227	26	247	75	1	18
Sheep (<i>Ovis aries</i>)	2	0	38	5	43	21	0	1
Goat (<i>Capra hircus</i>)	0	0	10	0	9	0	0	2
Sheep/goat	5	1	163	17	88	59	5	16
Equid (<i>Equus</i> sp)	1	0	0	0	0	1	0	0
Red deer (<i>Cervus elaphus</i>)	0	0	7	0	1	1	0	0
Roe deer (<i>Capreolus capreolus</i>)	0	0	2	0	0	0	0	0
Dog (<i>Canis familiaris</i>)	0	0	7	0	4	3	0	0
Dog/fox (<i>Canis familiaris/Vulpes vulpes</i>)	0	0	5	0	0	0	0	0
Cat (<i>Felis catus</i>)	0	0	2	0	0	0	0	0
Hare (<i>Lepus europaeus</i>)	0	1	18	0	1	1	0	0
Cattle/red deer	1	0	1	1	0	1	1	2
Large mammal	1	1	157	4	2	26	9	14
Medium mammal	3	1	180	4	4	39	1	8
Carnivore	0	0	1	0	0	0	0	0
Total	46	22	1231	100	633	394	37	92

recorded as sheep/goat. Of those that could be identified to species, sheep are dominant by a ratio of approximately 4:1 making it reasonable to assume that the majority of the sheep/goat bones belong to sheep. Phases 3, 4, 8 and 9 in Area A contained too few mammal bones for meaningful analysis therefore the following discussion will only consider Area A Phases 5, 6, and 7, which are directly related to the first amphitheatre and Area B Phase

6, which consists of a dump of material deposited to create the seating bank of Amphitheatre 1b.

Relative frequencies of major domesticates

The relative frequencies of the three main mammal groups (cattle, sheep/goat and pig) are quantified in Table 90 (NISP 1,885) for the phases under consideration. All phases in Area A have a similar deposition pattern: approximately

Table 89 Roman mammal % NISP.

Animal/Phase	A3	A4	A5	A6	B6	A7	A8	A9
Cattle (<i>Bos taurus</i>)	54.3	63.6	33.5	43.0	37.0	42.4	54.1	33.7
Pig (<i>Sus domesticus</i>)	17.4	18.2	18.4	26.0	39.0	19.0	2.7	19.6
Sheep (<i>Ovis aries</i>)	4.3	0.0	3.1	5.0	6.8	5.3	0.0	1.1
Goat (<i>Capra hircus</i>)	0.0	0.0	0.8	0.0	1.4	0.0	0.0	2.2
Sheep/goat	10.9	4.5	13.2	17.0	13.9	15.0	13.5	17.4
Equid (<i>Equus</i> sp)	2.2	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Red deer (<i>Cervus elaphus</i>)	0.0	0.0	0.6	0.0	0.2	0.3	0.0	0.0
Roe deer (<i>Capreolus capreolus</i>)	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Dog (<i>Canis familiaris</i>)	0.0	0.0	0.6	0.0	0.6	0.8	0.0	0.0
Dog/fox (<i>Canis familiaris/Vulpes vulpes</i>)	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Cat (<i>Felis catus</i>)	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Hare (<i>Lepus europaeus</i>)	0.0	4.5	1.5	0.0	0.2	0.3	0.0	0.0
Cattle/red deer	2.2	0.0	0.1	1.0	0.0	0.3	2.7	2.2
Large mammal	2.2	4.5	12.8	4.0	0.3	6.6	24.3	15.2
Medium mammal	6.5	4.5	14.6	4.0	0.6	9.9	2.7	8.7
Carnivore	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0

Table 90 Roman Phases main domesticates.

Animal/Phase	NISP				% NISP			
	A5	A6	B6	A7	A5	A6	B6	A7
Cattle	413	43	234	167	48.5	47.3	37.7	51.9
Pig	227	26	247	75	26.7	28.6	39.8	23.3
Sheep and goat	211	22	140	80	24.8	24.2	22.5	24.8
Total	851	91	621	322				

50 % cattle, and pigs and sheep in equal numbers though pigs are marginally more frequent than sheep in the earlier phases. Area B has a slightly different pattern. The relative amount of sheep is the same as Area A but pigs increase to 40 % of the assemblage at the expense of cattle which are reduced to 38 %. It is unusual, if not unique, for pig remains to outnumber cattle at British Roman sites of this period. At sites excavated in the legionary fortress at Chester cattle always make up more than 50 % of the assemblage (Cartledge 1991) and at Delamere Street, in the *canabae legionis* located north of the fortress, cattle dominate the assemblage accounting for 93 % of the cattle, pig and sheep/goat group (Baxter 2009). In Area B cattle and sheep are found in the same ratio as in Area A, it is the large number of pigs in Area B that is responsible for the shift in the ratio.

Cattle

Cattle body parts

Cattle body parts from Area A Phases 5 and 7 and Area B Phase 6 are presented in Table 91. A breakdown of cattle

elements by zone in these phases is presented in Tables 90–93. Calculating MAUs, all samples are dominated by meat bearing elements including the scapula, pelvis and femur confirming the NISP values in Table 91. Area A Phase 5 also contains a significant number of lumbar vertebrae and ribs, also meat bearing elements. Vertebrae and ribs were not quantified in Area B.

Cattle body part comparison with other Chester sites

At Delamere Street Baxter (2009) compared the frequency of non-meat-bearing metapodials to meat-bearing elements and found that the cattle remains represent a strong selection for primary butchery waste in the form of metapodials which made up 66 % of the examined assemblage. At the five Chester fortress sites (Cartledge 1991), on the other hand, cattle metapodia accounted for 17 % of the assemblage while the pelvis (20 %), scapula (16 %), humerus (12 %) and femur (12 %) were also strongly represented. The cattle remains from both Area A and B in the amphitheatre closely resemble the fortress assemblages in that meat-bearing elements are strongly represented at the expense of non-meat-bearing metapodials (Table 95) suggesting that they represent a mixture of both consumption and primary butchery waste.

Cattle size

Only two cattle bones, a metacarpal and a metatarsal, survived complete allowing a greatest length measurement to be taken and withers height determined. Both of these bones were recovered in Area B, Phase (2500) and it is possible they derive from the same individual. Using Matolcsi's (1970) multiplier the withers height indicated

Table 91 Cattle elements by phase.

Area/Phase	Area A Phase 5			Area B Phase 6			Area A Phase 7		
Element	NISP	MAU	%MAU	NISP	MAU	%MAU	NISP	MAU	%MAU
Skull	8	4.0	35	4	2.0	21	3	1.5	20
Horncore	1	0.5	4	5	2.5	26	0	0.0	0
Mandible	8	4.0	35	10	5.0	53	6	3.0	40
Atlas	3	3.0	26	2	2.0	21	2	2.0	27
Axis	0	0.0	0	4	4.0	42	0	0.0	0
Cervical Vert	17	3.4	30	na	na	na	4	0.8	11
Thoracic Vert	16	1.2	11	na	na	na	3	0.2	3
Lumbar Vert	43	7.2	62	na	na	na	10	1.7	22
Sacrum	4	4.0	35	na	na	na	1	1.0	13
Caudal Vert	2	0.1	1	na	na	na	3	0.2	2
Rib	170	6.5	57	1	1.0	11	58	2.2	30
Scapula	14	7.0	61	11	5.5	58	15	7.5	100
Humerus	8	4.0	35	8	4.0	42	5	2.5	33
Radius	11	5.5	48	8	4.0	42	2	1.0	13
Ulna	5	2.5	22	10	5.0	53	1	0.5	7
Metacarpal	7	3.5	30	14	7.0	74	4	2.0	27
Pelvis	23	11.5	100	19	9.5	100	8	4.0	53
Femur	4	2.0	17	15	7.5	79	11	5.5	73
Tibia	9	4.5	39	13	6.5	68	3	1.5	20
Metatarsal	6	3.0	26	10	5.0	53	3	1.5	20
Metapodial	4	1.0	9	3	0.8	8	0	0.0	0
Astragalus	4	2.0	17	5	2.5	26	2	1.0	13
Calcaneus	5	2.5	22	10	5.0	53	3	1.5	20
1st Phalanx	15	1.9	16	32	4.0	42	6	0.8	10
2nd Phalanx	9	1.1	10	23	2.9	30	5	0.6	8
3rd Phalanx	8	1.0	9	27	3.4	36	5	0.6	8
Total	404			234			163		

by our two specimens is 99.7 cm and 101.1 cm (Table 96). This height is at the bottom of the size range of cattle recovered from the nearby Delamere Street site where cattle ranged in withers height from 99–123 cm with a mean of 107 cm (Baxter 2009). Other cattle measurements are shown in Appendix 7.

Cattle dental ageing

Very little evidence for cattle ageing is available from dental eruption and wear from both Area A (N=5) and Area B (N=4) (Table 97). What evidence that does exist suggests that cattle of all ages were being killed and deposited in both areas.

Cattle bone fusion

Although there are more data for cattle bone fusion than dental ageing there is still not enough to consider phases from Area A individually so all phases are combined (N=95) (Table 98). Very few cattle were killed before 16 months

of age. With the exception of group C data (24–36 months) where 33 % of the elements are fused indicating that a number of cattle were killed around two years of age, the majority of elements in the later fusing groups D (36–42 months) and E (42–48 months) are fused (80 % and 75 % respectively) indicating that most animals were kept alive until they were past 4 years of age.

Fusion data from Area B Phase 6 (N=125) show that, in a similar fashion to Area A, few cattle were killed before they reached 16 months of age (Table 99). The later fusing groups C, D and E suggest a slow and steady kill off of cattle between 24 and 48 months with 44 % of animals living beyond four years of age. It appears that the Area B cattle were often killed before they reached three years of age and may represent animals specifically selected for meat consumption.

There is little comparative evidence available from sites in the fortress however Cartledge (1991) suggests cattle

Table 92 Area A, Site Phase 5, cattle element zones; loose teeth not included.

Element	NISP	1	2	3	4	5	6	7	8	9	total zones
Skull	8	1									1
Horncore	1	1									1
Mandible	8				2	1	1	2			6
Atlas	3		1								1
Axis	0										0
Cervical Vert	17										0
Thoracic Vert	16										0
Lumbar Vert	43										0
Sacrum	4		1								1
Caudal Vert	2										0
Rib	170										0
Scapula	14		2		1			1	1		5
Humerus	8								1	1	2
Radius	11	3	1	1	2	1	1	1	2		12
Ulna	5	2		1	1				1		5
Metacarpal	7	4	3			1	1	2	2		13
Pelvis	23	3	3		1	3				3	13
Femur	4	1			1	1					3
Tibia	9	1	2		1						4
Metatarsal	6	1				3		2	2		8
Metapodial	4									2	2
Astragalus	4	4									4
Calcaneus	5	2			1				2		5
1st Phalanx	15	14									14
2nd Phalanx	9	9									9
3rd Phalanx	8	7									7
Total	404										116

were mostly killed as adult animals. Cattle ageing evidence from Area A matches that from the Roman phases at the Delamere Street site (Baxter 2009, 3) which indicates that the majority of cattle killed were dentally and skeletally mature. No foetal or neonate cattle remains were recovered from Area A or B so it is unlikely cattle breeding was occurring in the immediate vicinity.

Cattle butchery

The butchery codes in this analysis follow Lauwerier (1988) and the extra codes suggested by Smith defined in Table 87. The cattle butchery codes and data are shown in Table 100.

Relatively few marks are recorded on the mandible (N=19). The most common butchery mark recorded on mandibles (21) is a horizontal chop through the ascending ramus made in order to remove the mandible from the rest of the skull. This mark together with a chop (34) in the same location but angled diagonally in an antero-dorsal to posterior-ventral direction, and a horizontal chop (35) on the same line as (21) but below the level of the tooth row make up over a third of the marks recorded. A single cutmark (10) is recorded on the base of the ramus suggesting flesh removal. Several hack marks (1, 3, 4, 7 and 8) indicate

that mandibles were regularly broken into, presumably for marrow recovery.

Scapulae showed 29 butchery marks at 11 locations. The most common marks (38 %) are hack marks cutting off the spine from a distal direction (3) followed (25 %) by hacking through the midpoint of the scapula in a cranio-caudal orientation (31) and (41) diagonally from the posterior angle to the neck (10 %). A single perforation through the infraspinous fossa is recorded providing evidence for the hanging of meat secured by a hook in this location for storage or roasting.

Humeri had 24 butchery marks at 14 locations. The most common marks (17 %) were hacks through the middle of the diaphysis (11) and longitudinal hacks (13 %) through the middle of the distal epiphysis and shaft (34). Disarticulation of the elbow joint is represented by hacking in several locations (18, 20, 36, 40) making up 25 % of the butchery marks.

Radii had 22 butchery marks at 12 locations. The most common marks are anterior-posterior hacks on the distal (36 %) (34, 35) and proximal (14 %) (4) ends of the bone followed by transverse hacks splitting the diaphysis (18 %) (25, 26).

Table 93 Area A, Site Phase 7, cattle element zones; loose teeth not included.

Element	NISP	1	2	3	4	5	6	7	8	9	total zones
Skull	3	1	1	1	1						4
Horncore	0										0
Mandible	6	1	1	1	1	3		1			8
Atlas	2										0
Axis	0										0
Cervical Vert	4										0
Thoracic Vert	3										0
Lumbar Vert	10										0
Sacrum	1										0
Caudal Vert	3										0
Rib	58										0
Scapula	15	2	2			2				1	7
Humerus	5	1						2		2	5
Radius	2	1									1
Ulna	1	1									1
Metacarpal	4	3	2		1	1	1				8
Pelvis	8				2	2				1	5
Femur	11	2	1		2			1			6
Tibia	3				1						1
Metatarsal	3	1	1			2	1	1	1		7
Metapodial	0										0
Astragalus	2	1									1
Calcaneus	3	1		1	1				1		4
1st Phalanx	6	5									5
2nd Phalanx	5	5									5
3rd Phalanx	5	5									5
Total	163										73

Pelves had 50 butchery marks at 16 locations. The majority of butchery marks are hacks at or adjacent to the acetabulum (48 %) (5, 6, 29) and transverse hacks on the ilium (16 %) (13). There is a single shave mark on the dorsal face of the ilium (17).

The elements most frequently exhibiting butchery marks are ribs followed by vertebrae. 528 butchery marks were recorded on ribs at nine locations. The area most commonly exhibiting hacking marks is the lower (ventral) half of the rib (9) from which over 50 % of marks were recorded. Chopping at this location indicates that ribs were split to remove the brisket and create smaller rib packets, perhaps as a 'pot-sizing', rationing or sizing for storage technique. Little butchery was observed near the articular surface of the ribs (3, 4, 10) (6 %) indicating that removal of the ribs from the vertebrae was not dependant on chopping through this section of the bone. Rather, removal of the ribs was accomplished by hacking through the lateral sections of the thoracic vertebrae (6, 9) in a dorso-ventral direction (36 %). These were also the most common marks on the cervical and lumbar vertebrae (cervical 43 %; lumbar (26 %). The second most common type of marks on thoracic vertebrae

are horizontal hacks through or just above the centrum (13, 17, 25) (32 %). Lumbar vertebrae are split into left and right halves (20, 24) (24 %) and have their transverse processes hacked off from a cranial direction (1) (8 %) indicating this section of the cattle carcass was split sagittally.

Disarticulation of the skeleton during butchery is represented by the following hacking marks on the long bones: humerus locations (1, 3, 5, 18, 20, 34, 36, 37 and 40) accounting for 59 % of the marks; radius locations (1, 2, 4, 5, 14, 33 and 34) accounting for 85 % of the marks; metacarpal location 11 accounting for 11 % of the marks; femur locations (3, 4, 11, 14 and 36–38) accounting for 78 % of the marks; tibia locations (1, 2, 33, 34 and 40) accounting for 36 % of the marks. Numerous long bones were chopped transversely through the shaft, presumably for marrow extraction (Lauwerier 1988: 155). On the humerus transverse hacking accounts for 17 % of butchery marks, on the radius 18 %, on the metacarpal 44 %, on the femur 22 %, on the tibia 43 % and on the metatarsal 64 %. Occasionally long bones, particularly metapodials, were split in the direction of the long axis. On the humerus longitudinal chopping accounts for 17 % of butchery marks,

Table 94 Area B, Site Phase 6, cattle element zones; loose teeth not included.

Element	NISP	1	2	3	4	5	6	7	8	9	total zones
Skull	4	3	3	2	1	0	1	1	0	0	11
Horncore	5	4							1		5
Mandible	10	1	2	1	1	4	2	2		1	14
Atlas	2	2									2
Axis	4	2	3								5
Sacrum	1		1								1
Scapula	11	1	1		2	8		9	3	6	30
Humerus	8	2			1	2		5	2	3	15
Radius	8	3	3		1		1	2	1		11
Ulna	10	1			7				2		10
Metacarpal	14	6	4		3	8	3.5	6	5	1	36.5
Pelvis	19	5	4		4	1		3		6	23
Femur	15	2	1	3	5	4	0.5	3	4	1	23.5
Tibia	13	5	3	3.5	1	2	1	5	4		24.5
Metatarsal	10	3	4		3	6		6	6	1	29
Metapodial	3							1	2	1	4
Astragalus	5	5									5
Calcaneus	10	3		2	5				4		14
1st Phalanx	32	30		4							34
2nd Phalanx	23	21		2							23
3rd Phalanx	27	26.5									26.5
Total	234										347

on the radius 9 %, on the metacarpal 44 %, on the tibia 21 % and on the metatarsal 36 %.

The vast majority (95 %) of butchery marks are hack marks indicating carcasses were consistently processed with the use of large cleaver-like instruments (see Seetah 2006). Only 4 % of butchery marks are cut marks, and less than one percent are shave marks or perforations (a single perforation was recorded on the blade of a scapula).

A comparison of the amphitheatre cattle butchery pattern with that from Delamere Street (Baxter 2009) yields the following results. At the amphitheatre, hacking the scapula into two large segments (31, 41) was much more common than at Delamere Street while Delamere Street had marks on the coracoid process (6, 11, 19) associated with the removal of the shoulder blade from the pectoral girdle that are absent at the amphitheatre. Delamere Street had a higher percentage of marks representing the disarticulation of the elbow joint (67 %) than at the amphitheatre (25 %). As at the amphitheatre, chopping through of the diaphysis is very common at Delamere Street: humerus (11) (30 %); radius (26) (34 %); femur (21) (36 %); tibia (12) (33 %); metacarpal (15) (90 %); metatarsals (15) (92 %). Baxter (2009) interprets these chops as the common method of dividing meat into portions or, in the case of the metapodials, as a method of marrow extraction. As at the amphitheatre, very few skinning marks were recorded at Delamere Street. In general the butchery pattern at both sites is similar with a high amount of heavy chopping, an

extensive amount of transverse bone splitting and a heavy handed approach to joint disarticulation.

Very little butchery data from the Chester fortress sites (Cartledge 1991) are available but as with the amphitheatre and Delamere Street chopping was extensively used and is recorded on almost half (49.3 %) of the cattle long bones and girdles.

Sheep

Sheep body parts

Because sheep dominated over goat at the site, when quantifying sheep remains the sheep/goat remains are counted as sheep. This inevitably means that some of the material derives from goat but it is not thought that this will significantly alter the conclusions. Sheep body parts from Area A Phase 5 and Area B Phase 6 are presented in Table 101. A breakdown of sheep elements by zone from the same areas are shown in Tables 102 and 103.

Sheep body part comparison with other Chester sites

All of the sites have a good representation of the whole carcass indicating both consumption and butchery debris was deposited (Table 104). All sites show a high amount of radius and tibia and both the amphitheatre and fortress have a relatively greater amount of scapula and femur. Delamere Street has a higher amount of metapodials (29 %) than the other sites, though not nearly as high as seen with the cattle. Nevertheless, the Delamere Street site has a greater

Table 95 Chester Amphitheatre cattle meat-bearing elements versus metapodials (Fortress sites (Cartledge 1991), Delamere Street (Baxter 2009)).

<i>Site/Phase</i>	<i>Area A 5 and 7</i>		<i>Area B 6</i>		<i>Fortress sites (all periods)</i>		<i>Delamere Street</i>	
Element	NISP	%	NISP	%	NISP	%	NISP	%
Scapula	29	20	11	10	250	16	85	14
Humerus	13	9	8	7	176	12	45	7
Radius	13	9	8	7	126	8	16	3
Ulna	6	4	10	9	75	5	3	0.5
Pelvis	31	22	19	17	310	20	13	2
Femur	15	10	15	14	180	12	11	2
Tibia	12	8	13	12	143	9	38	6
Metacarpal	11	8	14	13	105	7	181	29
Metatarsal	9	6	10	9	134	9	228	37
Metapodial	4	3	3	3	24	2	0	0
Total Metapodial	24	17	27	24	263	17	409	66
Total NISP	143		111		1523		620	

Table 96 Cattle and sheep withers heights.*Cattle (Matolcsi 1970)*

Area	Phase	Context	Element	GL (mm)	Withers height (cm)
B	6	2500	Metacarpal	161.0	99.7
B	6	2500	Metatarsal	185.5	101.1

Sheep (Teichert 1975)

Area	Phase	Context	Element	GL (mm)	Withers height (cm)
B	6	2513	Metacarpal	113.8	55
B	6	2498	Metacarpal	121.0	59
B	6	2498	Metatarsal	121.1	55
B	6	2513	Metatarsal	131.8	59
B	6	2498	Calcaneus	47.5	49
A	5	1152	Astragalus	25.0	48
A	5	625	Astragalus	24.6	47
B	6	2513	Astragalus	24.4	47
B	6	2450	Astragalus	24.9	48

Table 97 Suggested cattle age categories for hand collected mandibles (Halstead 1985 and Silver 1969).

Area	A	B
1–8 months	1	1
30–36 months	2	1
adult	1	1
senile	1	1

proportion of butchery waste than the amphitheatre and fortress which have a higher degree of consumption waste.

Sheep size

Sheep withers' heights were calculated using Teichert's (1975) multipliers (Table 96). Restricting withers height calculations indicates a range of 55–59 cm for our sheep; similar to the Delamere Street range of 54–62 cm. Including

Table 98 Area A, cattle long bone fusion data.

Group	Element	Months	Fused	Unfused	% Fused
A	Proximal Radius	6–12	2	1	67
	Distal Humerus		1	1	50
	Pelvis		17	0	100
	Scapula		2	0	100
	Group Total		22	2	92
B	2nd Phalanx	13–16	17	0	100
	1st Phalanx		23	0	100
	Group Total		40	0	100
C	Distal Tibia	24–36	1	2	33
	Distal Metacarpal		0	5	0
	Distal Metatarsal		5	3	63
	Distal Metapodial		0	2	0
	Group Total		6	12	33
D	Calcaneus	36–42	3	1	75
	Proximal Femur		1	0	100
	Group Total		4	1	80
E	Distal Femur	42–48	0	0	na
	Proximal Ulna		2	1	67
	Distal Radius		2	1	67
	Proximal Tibia		1	0	100
	Proximal Humerus		1	0	100
	Group Total		6	2	75
Grand Total			78	17	95

Table 99 Area B, cattle long bone fusion data.

Group	Element	Months	Fused	Unfused	% Fused
A	Proximal Radius	6–12	6	0	100
	Distal Humerus		5	0	100
	Pelvis		7	0	100
	Scapula		5	0	100
	Group Total		23	0	100
B	2nd Phalanx	13–16	17	2	89
	1st Phalanx		26	6	81
	Group Total		43	8	84
C	Distal Tibia	24–36	3	2	60
	Distal Metacarpal		5	5	50
	Distal Metatarsal		7	0	100
	Distal Metapodial		0	3	0
	Group Total		15	10	60
D	Calcaneus	36–42	2	3	40
	Proximal Femur		1	2	33
	Group Total		3	5	38
E	Distal Femur	42–48	3	4	43
	Proximal Ulna		1	0	100
	Distal Radius		0	1	0
	Proximal Tibia		3	4	43
	Proximal Humerus		1	1	50
	Group Total		8	10	44
Grand Total			92	33	125

the calcaneus and astragalus in the height range would reduce it significantly but it is considered prudent not to use those data here because these small bones have very large multipliers and are prone to indicating overly large or small sizes. Other sheep measurements and securely identified goat measurements are tabulated in Appendix 7.

Sheep dental ageing

There is very little dental ageing evidence from either Area A (N=10) or B (N=3) (Table 105). In all periods from Area A the limited dental evidence indicates slaughter of sheep was concentrated between 6 months and 2 years of age (Table 106). There is not enough data from Area B to comment.

Sheep bone fusion

In order to increase the amount of data available all phases of Area A are considered together (N= 101) (Table 107). Groups A (0–6 months), B (6–12 months) and C (12–18 months) have approximately 60 % of their elements fused (55 %, 68 %, 65 % respectively). Elements in groups D (18–30 months) and E (30–48 months) both show a significant drop to 17 % fused. The single example of group F (48+ months; proximal humerus) is unfused. Relatively few sheep that lived past 18–30 months of age were deposited in Area A which generally accords with the scant dental evidence. Three sheep elements were recorded

as being neonate in appearance in Area A, two from Phase 7 and one from Phase 6.

Cartledge (1991) notes that there is a ‘tenuous’ indication in the fusion data from locations in the fortress that sheep may be kept alive longer in later periods (3rd–4th century). To test whether sheep slaughter patterns shifted across time, the data from Area A were divided into Phase 5 (N=59) (Table 108), Amphitheatre 1a use, and 7(N=32) (Table 109), Amphitheatre 1b use. Noting that this subdivision leads to reduced data sets greatly limiting interpretation, the overall trend from both periods is the same as that seen for all periods combined suggesting that there was little change in sheep culling and deposition patterns throughout the use of the first Roman amphitheatre (1st–2nd century). Not enough evidence exists to test whether the pattern of sheep slaughter shifted by the time of the construction of the second Roman amphitheatre.

Bone fusion data from Area B Phase 6 (N= 90) are presented in Table 110. Elements in group A (0–6 months) are mostly fused (67 %); this is slightly higher than Area A. Elements in Groups B (6–12 months) and C (12–18 months) in Area B were fused at death around 35 % of the time (38 % and 32 % respectively) indicating greater numbers of young sheep were killed and deposited in Area B relative to Area A. Similar numbers of sheep were living past group D (18–30 months) in Area B (23 % fused) relative to Area

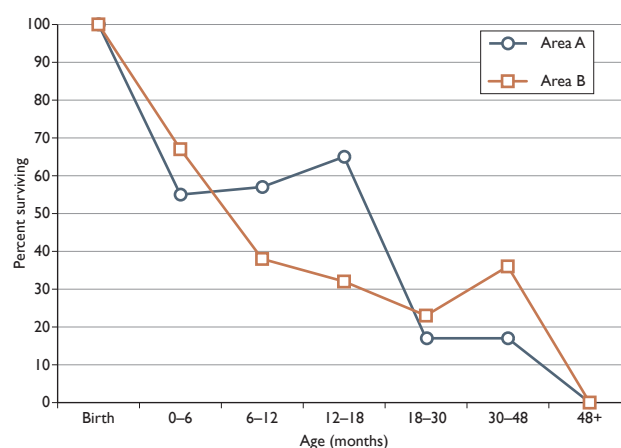
[illegible]

Table 101 Sheep/goat elements by Site Phase.

Area/Phase	Area A Phase 5			Area B Phase 6		
Element	NISP	MAU	%MAU	NISP	MAU	%MAU
Skull	16	8.0	89	3	1.5	25
Horncore	4	2.0	22	2	1.0	17
Mandible	10	5.0	56	11	5.5	92
Atlas	1	1.0	11	2	2.0	33
Axis	1	1.0	11	0	0.0	0
Cervical Vert	5	1.0	11	na	na	na
Thoracic Vert	12	0.9	10	na	na	na
Lumbar Vert	10	1.7	19	na	na	na
Sacrum	0	0.0	0	1	1.0	17
Caudal Vert	0	0.0	0	na	na	na
Rib	29	1.1	12	na	na	na
Scapula	12	6.0	67	10	5.0	83
Humerus	6	3.0	33	9	4.5	75
Radius	18	9.0	100	9	4.5	75
Ulna	7	3.5	39	5	2.5	42
Metacarpal	4	2.0	22	6	3.0	50
Pelvis	6	3.0	33	9	4.5	75
Femur	10	5.0	56	9	4.5	75
Tibia	10	5.0	56	12	6.0	100
Metatarsal	10	5.0	56	8	4.0	67
Metapodial	4	1.0	11	2	0.5	8
Astragalus	4	2.0	22	5	2.5	42
Calcaneus	3	1.5	17	6	3.0	50
1st Phalanx	4	0.5	6	14	1.8	29
2nd Phalanx	7	0.9	10	11	1.4	23
3rd Phalanx	3	0.4	4	6	0.8	13
Total	196			140		

A (17 % fused) and higher numbers of sheep living beyond group E (30–48 months) were deposited (36 % fused) in Area B. As with Area A, the single example of a group F (48+ months) element was recovered unfused. Sheep survivorship curves from Area A and Area B are displayed in Fig 329. Four sheep elements were recorded as being neonate in appearance in Area B Phase 6. The neonate bones from both areas suggest that sheep breeding was occurring in the vicinity.

The sheep ageing data from Chester amphitheatre generally agrees with evidence from other Roman period sites in the region (Cartledge 1991). Dental evidence at the Chester fortress sites indicates over half of the sheep/goats were killed before they reached 12 months and a further 25 % were killed by the time they were four years old. This trend is consistent through time. The fusion evidence generally agrees with the dental evidence in that a substantial number (over 40 % at Crook Street) of early

**Fig 329** Sheep survivorship curve, comparing Areas A and B.

fusing elements were recovered unfused. An exception is the Delamere Street site (Baxter 2009) where the majority of sheep elements were recovered fused indicating the animals lived beyond the age of 30–48 months.

Sheep butchery

Sheep butchery data and codes are shown in Table 111. Compared with cattle, there is relatively little evidence for sheep butchery marks. The elements most frequently recovered showing butchery marks include the radius, femur, ribs, and cervical and thoracic vertebrae.

There is evidence for mandible removal by chopping through the coronoid process (18, 15) as well as subsequent vertical chopping of the mandible along the tooth row to access its internal cavity, possibly for marrow (1, 2, 3). The few marks on scapulae indicated the blade was split in half both cranio-caudally (31) and proximo-distally (44). In a similar fashion to cattle, a single perforation of the blade was recorded (40) indicating the fore-limb was hung by a hook secured through the scapula for storage or roasting. Marks on the humerus are limited to chopping through the mid-point of the shaft splitting the bone into proximal and distal halves (11, 12) and separation of the elbow joint through both heavy chopping at the articular surface (18, 37), as well as more subtle cutting on the distal articular surface (37).

In partnership with the chopping on the distal humerus, horizontal chopping marks are found on the proximal radius (25) that serve to disjoin the limb. Heavy chop marks are also found at the mid point of the diaphysis (26) and the distal end of the shaft (27). These marks would have split the bone, and associated meat, into smaller sections as well as allow access to the internal cavity. The radius-carpal-metacarpal joint was also disarticulated through controlled cutting at the distal articular surface (30) and (32).

The femur was removed from the pelvis by controlled cutting of muscle and ligaments at the head (2) as well as by heavy chopping through the proximal shaft at the lesser

Table 102 Area A, Site Phase 5, sheep/goat zones; loose teeth not included.

Element	NISP	1	2	3	4	5	6	7	8	9	total zones
Skull	16	4	2	1	2			3			12
Horncore	4	2									2
Mandible	10	3	1	1	6	3	3	2			19
Atlas	1	1	1								2
Axis	1										0
Cervical Vert	5										0
Thoracic Vert	12										0
Lumbar Vert	10										0
Sacrum	0										0
Rib	29										0
Scapula	12		2		2	3	1	3	1	4	16
Humerus	6				3	3	1			2	9
Radius	18	3	4	1	9	7	4	2	2		32
Ulna	7	1		2	4				5		12
Metacarpal	4	1	1		1	1	1	1	1		7
Pelvis	6	1	1		1	2	1		1	2	9
Femur	10	2	2	1	2	2	2				11
Tibia	10			1	2	5	2	4	4		18
Metatarsal	10	5	5		4	1		1	1		17
Metapodial	4									3	3
Astragalus	4	4									4
Calcaneus	3			3	3				3		9
1st Phalanx	4	3		1							4
2nd Phalanx	7	5									5
3rd Phalanx	3	3									3
Total	196										194

trochanter (37). Numerous cut marks were recorded along the length of the shaft (18), (21), (24) indicating meat was stripped from the bone. The femur was also chopped into smaller sections with hacks at the mid-point (21) and near the distal end (24).

The only marks recorded on metacarpals are heavy longitudinal chopping, splitting the shaft into medial and lateral halves (19). Evidence for butchery was more frequently left on the metatarsals which showed transverse chopping through the mid-shaft and cut marks on every face of the proximal shaft just distal to the articular surface that might be interpreted as either disarticulation or skinning marks. Marks on the pelvis are limited to chopping through the shaft of the ilium (12), (13), (32). The single tibia recovered with butchery marks was chopped through both the proximal (39) and mid shaft (12) indicating that this bone as well was occasionally divided into smaller sections.

The ribs are the element recorded with butchery marks most frequently as we would expect, considering there are 26 per animal. They were hacked away from the thoracic vertebrae near the articular surface (4). Ribs were frequently chopped into smaller sections by hacking

through both the upper (dorsal) (8) and lower (ventral) (9) half of the body. As with cattle these chops would break the rib package down into smaller, manageable portions of meat. The most common marks on cervical vertebrae are hacks through the lateral sections in a dorso-ventral direction (6, 9). The most common type of marks on thoracic vertebrae are horizontal hacks through or just above the centrum (13, 25). Thoracic vertebrae were also subjected to axial hacks that split them into left and right halves, but this was less common.

There are a number of similarities between sheep and cattle butchery. Sheep long bones were frequently chopped transversely through or near the mid-point of the shaft. Similar heavy chopping marks were also recorded near the articular surfaces demonstrating a very no nonsense method of joint disarticulation. In contrast to cattle, however, there is some evidence to suggest a more subtle practice of disarticulation was also used on sheep in the form of well positioned cut marks designed to sever soft tissue rather than smash bone. Examples are found on the head of the femur (2) the distal radius (30) and (32) and the distal humerus (37).

Table 103 Area B, Site Phase 6, sheep/goat element zones; loose teeth not included.

Element	NISP	1	2	3	4	5	6	7	8	9	total zones
Skull	3	1	2		2			2			7
Horncore	2	1							1		2
Mandible	11	2	1	1	7	1	2	3		1	18
Atlas	2	2	1								3
Axis	0										0
Cervical Vert	na										na
Thoracic Vert	na										na
Lumbar Vert	na										na
Sacrum	1			1							1
Rib	na										na
Scapula	10		1			8	2	3	1	9	24
Humerus	9			1		6	1	4	4	6	22
Radius	9	1	2		6	2		2	2		15
Ulna	5	1		1	5				3		10
Metacarpal	6	2	4		5	4	2	2	2	1	22
Pelvis	9		3		4	2	1	1	2	2	15
Femur	9	5		2	2	2	2	1			14
Tibia	12			1	5	5	4	3	3		21
Metatarsal	8	5	5		6	5	3	2	2	2	30
Metapodial	2									2	2
Astragalus	5	5									5
Calcaneus	6	1		3	4				3		11
1st Phalanx	14	8		7							15
2nd Phalanx	11	7		4							11
3rd Phalanx	6	6									6
Total	140										254

Table 104 Chester sheep/goat meat-bearing elements versus metapodials (Fortress sites (Cartledge 1991), Delamere Street (Baxter 2009).

Site/Phase	Area A 5		Area B 6		Fortress sites (all periods)		Delamere Street	
Element	NISP	%	NISP	%	NISP	%	NISP	%
Scapula	12	14	10	13	57	11	2	3
Humerus	6	7	9	11	57	11	4	7
Radius	18	21	9	11	82	16	9	15
Ulna	7	8	5	6	29	5	4	7
Pelvis	6	7	9	11	49	9	8	14
Femur	10	11	9	11	51	10	2	3
Tibia	10	11	12	15	107	20	13	22
Metacarpal	4	5	6	8	35	7	9	15
Metatarsal	10	11	8	10	59	11	8	14
Metapodial	4	5	2	3	2	0	0	0
Total Metapodial	18	21	16	20	96	18	17	29
Total NISP	87		79		528		59	

Table 105 Suggested sheep age categories for mandibles (age stages adapted from Payne 1973 and Payne 1987).

Area	A	B
0–2 months	1	1
2–6 months	1	1
6–12 months	3	0
2 months – 2 years	4	0
1–2 years	1	1
2–3 years	0	0
3–4 years	0	0
4–6 years	0	0
4–8 years	0	0

Table 106 Suggested sheep age categories for mandibles from Area A by Phase (age stages adapted from Payne 1973 and Payne 1987).

Phase	3	5	6	7	9
0–2 months				1	
2–6 months				1	
6–12 months		1		1	1
2 months – 2 years	1	2		1	
1–2 years			1		
2–3 years					
3–4 years					
4–6 years					
4–8 years					

Table 107 Area A, Roman sheep long bone fusion (based on Zeder 2006).

Phase	3	5	6	7	9
0–2 months				1	
2–6 months				1	
6–12 months		1		1	1
2 months – 2 years	1	2		1	
1–2 years			1		
2–3 years					
3–4 years					
4–6 years					
4–8 years					

Table 108 Area A, Site Phase 5, sheep long bone fusion data (based on Zeder 2006).

Species			Sheep			Sheep/Goat			Total		
Group	Element	Months	Fused	Unfused	% Fused	Fused	Unfused	% Fused	Fused	Unfused	% Fused
A	Proximal Radius	0–6	2	0	100	0	2	0	2	2	50
	Group Total		2	0	100	0	2	0	2	2	50
B	Distal Humerus	6–12	0	0	na	1	2	33	1	2	33
	Pelvis		0	0	na	4	1	80	4	1	80
	Scapula		3	0	100	1	2	33	4	2	67
	Group Total		3	0	100	6	5	64	9	5	64
C	1st Phalanx	12–18	2	2	50	0	0	na	2	2	50
	2nd Phalanx		5	0	100	0	1	0	5	1	83
	Group Total		7	2	78	0	1	0	7	3	70
D	Distal Tibia	18–30	1	1	50	0	2	0	1	3	25
	Distal Metacarpal		0	0	na	0	1	0	0	1	0
	Distal Metatarsal		1	0	100	0	4	0	1	4	20
	Distal Metapodial		0	1	0	0	2	0	0	3	0
	Group Total		2	2	50	0	9	0	2	11	15
	Calcaneus		0	2	0	0	1	0	0	3	0
E	Proximal Femur	30–48	1	1	50	0	2	0	1	3	25
	Distal Femur		0	0	na	0	2	0	0	2	0
	Proximal Ulna		0	0	na	1	2	33	1	2	33
	Distal Radius		1	1	50	1	2	33	2	3	40
	Proximal Tibia		0	0	na	0	1	0	0	1	0
	Group Total		2	4	33	2	10	17	4	14	22
	Proximal Humerus		48+	0	0	na	0	0	na	0	0
Group Total	0	0		na	0	0	na	0	0	na	
Grand Total			16	8	24	8	27	35	24	35	59

Table 109 Area A Site Phase 7, sheep long bone fusion data (based on Zeder 2006).

<i>Species</i>			<i>Sheep</i>			<i>Sheep/Goat</i>			<i>Total</i>		
Group	Element	Months	Fused	Unfused	% Fused	Fused	Unfused	% Fused	Fused	Unfused	% Fused
A	Proximal Radius	0–6	2	1	67	1	1	50	3	2	60
	Group Total		2	1	67	1	1	50	3	2	60
B	Distal Humerus	6–12	1	0	100	0	0	na	1	0	100
	Pelvis		0	0	na	3	1	75	3	1	75
	Scapula		1	0	100	0	1	0	1	1	50
	Group Total		2	0	100	3	2	60	5	2	71
C	1st Phalanx	12–18	3	0	100	1	1	50	4	1	80
	2nd Phalanx		0	0	na	0	1	0	0	1	0
	Group Total		3	0	100	1	2	33	4	2	67
D	Distal Tibia	18–30	0	0	na	0	1	0	0	1	0
	Distal Metacarpal		0	0	na	0	1	0	0	1	0
	Distal Metatarsal		0	0	na	0	2	0	0	2	0
	Distal Metapodial		0	0	na	0	0	na	0	0	na
	Group Total		0	0	na	0	4	0	0	4	0
E	Calcaneus	30–48	1	1	50	0	0	na	1	1	50
	Proximal Femur		0	1	0	0	0	na	0	1	0
	Distal Femur		0	0	na	0	1	0	0	1	0
	Proximal Ulna		0	1	0	1	0	100	1	1	50
	Distal Radius		0	2	0	0	1	0	0	3	0
	Proximal Tibia		0	0	na	0	0	na	0	0	na
	Group Total		1	5	17	1	2	33	2	7	22
F	Proximal Humerus	48+	0	0	na	0	1	0	0	1	na
	Group Total		0	0	na	0	1	0	0	1	na
Grand Total			8	6	14	6	12	18	14	18	32

Table 110 Area B, Roman sheep long bone fusion data (based on Zeder 2006).

Species			Sheep			Sheep/Goat			Total		
Group	Element	Months	Fused	Unfused	% Fused	Fused	Unfused	% Fused	Fused	Unfused	% Fused
A	Proximal Radius	0–6	2	0	100	0	0	na	2	1	67
	Group Total		2	0	100	0	0	na	2	1	67
B	Distal Humerus	6–12	2	0	100	2	3	40	4	3	57
	Pelvis		0	0	na	3	4	43	3	4	43
	Scapula		1	1	50	0	5	0	1	6	14
	Group Total		3	1	75	5	12	29	8	13	38
C	1st Phalanx	12–18	2	1	67	1	10	9	3	11	21
	2nd Phalanx		3	2	60	1	2	33	4	4	50
	Group Total		5	3	63	2	12	17	7	15	32
D	Distal Tibia	18–30	1	0	100	0	6	0	1	6	14
	Distal Metacarpal		2	1	67	0	3	0	2	4	33
	Distal Metatarsal		2	2	50	0	3	0	2	5	29
	Distal Metapodial		0	1	0	0	1	0	0	2	0
	Group Total		5	4	56	0	13	0	5	17	23
E	Calcaneus	30–48	1	1	50	1	1	50	2	2	50
	Proximal Femur		3	1	75	1	1	50	4	2	67
	Distal Femur		0	0	na	0	2	0	0	2	0
	Proximal Ulna		1	0	100	0	3	0	1	3	25
	Distal Radius		1	1	50	0	3	0	1	4	20
	Proximal Tibia		0	0	na	0	1	0	0	1	0
	Group Total		6	3	67	2	11	15	8	14	36
F	Proximal Humerus	48+	0	0	na	0	1	0	0	1	0
	Group Total		0	0	na	0	1	0	0	1	0
Grand Total			21	11	32	9	49	58	30	60	90

[illegible]

Table 112 Pig elements by Site Phase.

Area/Phase	Area A Phase 5			Area B Phase 6		
	NISP	MAU	%MAU	NISP	MAU	%MAU
Skull	16	8.0	84	15	7.5	65
Mandible	19	9.5	100	23	11.5	100
Atlas	3	3.0	32	3	3.0	26
Axis	0	0.0	0	1	1.0	9
Cervical Vert	4	0.8	8	na	na	na
Thoracic Vert	9	0.6	7	na	na	na
Lumbar Vert	2	0.3	4	na	na	na
Sacrum	0	0.0	0	na	na	na
Rib	42	1.5	16	na	na	na
Scapula	6	3.0	32	11	5.5	48
Humerus	8	4.0	42	14	7.0	61
Radius	9	4.5	47	16	8.0	70
Ulna	7	3.5	37	10	5.0	43
3rd Metacarpal	2	0.5	5	6	1.5	13
4th Metacarpal	1	0.3	3	5	1.3	11
Pelvis	5	2.5	26	17	8.5	74
Femur	7	3.5	37	18	9.0	78
Tibia	4	2.0	21	15	7.5	65
3rd Metatarsal	2	0.5	5	3	0.8	7
4th Metatarsal	1	0.3	3	5	1.3	11
Metapodial	11	0.7	7	17	1.1	9
Astragalus	5	2.5	26	2	1.0	9
Calcaneus	3	1.5	16	18	9.0	78
1st Phalanx	11	0.7	7	15	0.9	8
2nd Phalanx	8	0.5	5	15	0.9	8
3rd Phalanx	12	0.8	8	17	1.1	9
Total	197			246		

Table 113 Chester pig meat-bearing elements versus (Fortress sites (Cartledge 1991), Delamere Street (Baxter 2009).

Site/Phase	Area A5		Area B6		Fortress sites (all periods)		Delamere Street	
	NISP	%	NISP	%	NISP	%	NISP	%
Scapula	6	10	11	8	148	17	8	15
Humerus	8	13	14	10	131	15	12	23
Radius	9	14	16	12	71	8	2	4
Ulna	7	11	10	7	77	9	3	6
Pelvis	5	8	17	12	117	13	4	8
Femur	7	11	18	13	96	11	0	0
Tibia	4	6	15	11	136	16	10	19
Metacarpal	3	5	11	8	27	3	6	12
Metatarsal	3	5	8	6	46	5	7	13
Metapodial	11	17	17	12	24	3	0	0
Total								
Metapodial	17	27	36	26	97	11	13	25
Total NISP	63		137		873		52	

Pigs

Pig body parts

In Area A Phase 5 pig remains are dominated by the skull and mandible (Table 112). By contrast, Area B Phase 6 has a high amount of head parts as well as a strong representation of both fore and hind limb remains including the humerus, radius, pelvis, femur and tibia. All parts of the pig skeleton were deposited in Area B indicating they originally derive from an area where pigs were being butchered and consumed. Area A Phase 5 is dominated by pig butchery remains.

Pig body part comparison with other Chester sites

When pig skulls are removed from the analysis to facilitate comparison between the other Chester sites (Table 113) the dominance of the skull in Area A is also removed. When only considering the post-cranial elements we see that all elements were deposited in roughly equal proportions in both Areas A and B. The Delamere Street assemblage is dominated by shoulder (scapula, humerus) and lower limb elements (tibia, metapodials) indicating a consistent selection of body parts deposited in the area. By contrast, relatively few pig metapodials were recovered from the fortress assemblages suggesting that they were initially processed elsewhere. Pig element zone recovery is shown in Tables 114, 115.

Pig size

Too few measurements were available from pigs to accurately determine their body size. What metrics are available are presented in Appendix 7.

Pig dental ageing

Too few mandibles from Area A or B were recovered to allow a detailed analysis but it is clear from both areas that pigs were being slaughtered at all stages of life between birth and two years of age and no pigs were living beyond two years of age (Table 116).

Pig bone fusion

A clearer picture of pig slaughter ages is provided by the bone fusion data. All Phases of Area A are considered together (N=87) and the results are shown in Table 117. The majority of pigs were living beyond 12 months of age; 77 % of group A elements are fused. Very few pigs are living beyond 24 months of age; 10 % of group B elements are fused. The fusion data indicate a major slaughter of pigs between the ages of one and two years of age. A single element from Area A Phase 6 was recorded as being of neonate size.

The data from Area B Phase 6 (N=141) mirrors that from Area A (Table 118). The majority of elements in group A were fused (67 %) and the very few elements in group B were fused (12 %) indicating a significant slaughter of animals between the ages of one and two years. Slightly more pigs under one year of age were killed and deposited

Table 114 Area A, Site Phase 5, pig element zones; loose teeth not included.

Element	NISP	1	2	3	4	5	6	7	8	9	total zones
Skull	16	6	6	1	4		2	1			20
Mandible	19	7	2	2	7	2	6	4	5		35
Atlas	3	1	2								3
Axis	0										0
Cervical Vert	4										0
Thoracic Vert	9										0
Lumbar Vert	2										0
Sacrum	0										0
Rib	42										0
Scapula	6					3	1	1		1	6
Humerus	8				1	3		1	1	3	9
Radius	9	2	2	1	2	3	4	3	3		20
Ulna	7				5				4		9
3rd Metacarpal	2	2			2		1				5
4th Metacarpal	1				1						1
Pelvis	5	1	2		3	3			1	2	12
Femur	7			3	2	3					8
Tibia	4			2	3	2	2	1	1		11
3rd Metatarsal	2	2			1						3
4th Metatarsal	1		1								1
Metapodial	11									8	8
Astragalus	5	5									5
Calcaneus	3			2	3				1		6
1st Phalanx	11	3		3							6
2nd Phalanx	8	2									2
3rd Phalanx	12	11									11
Total	197										181

in Area B relative to Area A but the overall pattern in the two areas is similar. Two pig bones were recorded as being from neonates. Despite the limited number of neonates reported pigs were clearly being raised in the vicinity of the amphitheatre.

This pattern of slaughtering pigs at a young age is common and consistent with the data from sites in the Chester fortress where dental evidence indicates 93 % of pigs were killed before three years of age and only 5 % of late fusing bones were fused at death (Cartledge 1991). The evidence from the Delamere Street site (Baxter 2009) indicates slaughter of adult pigs but the available data are not sufficient to determine if the pigs were aged between one to two years or whether they were older.

Pig butchery

All parts of the pig exhibited butchery marks but the mandible, scapula, humerus and ribs were recovered with butchery marks most frequently (Table 119).

Pig mandibles were removed from the skull in a similar fashion to cattle with chops on the ascending ramus (34, 35) being frequent. They were also split open for marrow

collection with horizontal hacking along the body of the mandible at the tooth row (1, 2, 3). The most frequent butchery mark on pig scapulae are hack marks through the body of the blade in a cranio-caudal direction. The blade was also chopped through in other directions including diagonally from the posterior angle to the neck (41) and further towards the neck from the medial side (42). The most common marks on the pig humerus are transverse chop marks through the mid-point (11) and distal end (37, 38) of the shaft. There are a few cut marks on the posterior face of the proximal shaft (7, 8) indicating meat removal. There is also an example of longitudinal splitting at the distal end of the bone (41), similar to that seen in cattle.

As with other species, pig limb bones are often chopped transversely through the mid-point of the shaft. This type of hacking is present on the humerus as described as well as on the radius (26), femur (21), tibia (12) and metapodials (15) where they are the most common marks. Also similar to the other species pig ribs are chopped through both the upper (8) and lower (9) sections of their body to form them into smaller, more manageable packages.

Table 115 Area B, Site Phase 6, pig element zones; loose teeth not included.

Element	NISP	1	2	3	4	5	6	7	8	9	total zones
Skull	15	5	9		5			4			23
Mandible	23	5	2	1	5	3	1	4	6	2	29
Atlas	3	2	1								3
Axis	1	1	1								2
Cervical Vert	na										0
Thoracic Vert	na										0
Lumbar Vert	na										0
Sacrum	na										0
Rib	na										0
Scapula	11					5		5	5	7	22
Humerus	14	1	1		1	8		3	3	6	23
Radius	16	7.5	8	3	5	2	2	3	3		33.5
Ulna	10			6.5	9				6		21.5
3rd Metacarpal	6	6			5		5				16
4th Metacarpal	5		4		5		5		1		15
Pelvis	17	6	6	1	4	3	2	3		3	28
Femur	18	4		4.5	2	9	1.5		1	1	23
Tibia	15	3	2	1	4	4	4	6	7	0	31
3rd Metatarsal	3	3									3
4th Metatarsal	5		5		2						7
Metapodial	17						2			15	17
Astragalus	2	2									2
Calcaneus	18	5		10	9				9		33
1st Phalanx	15	10		4							14
2nd Phalanx	15	12		3							15
3rd Phalanx	17	17									17
Total	246										378

Table 116 Suggested pig age categories for mandibles (Halstead 1992 and Silver 1969).

Area	A	B
< 6 months	4	2
6–12 months	2	4
12–24 months	6	5
>24 months	0	0

Other mammals

Equid

Only two equid fragments were recovered: a mandibular tooth from Area A Phase 3 (1082) <4728>, and a rib from Area A Phase 7 (894). Species could not be determined on either element. Measurements were not taken on either specimen. Equids were also uncommon at sites within the fortress (Cartledge 1991) and at Delamere Street site in the *canabae* (Baxter 2009) representing less than one percent of either assemblage.

Deer

Two species of deer were identified: red deer and roe deer, with red deer being the more common of the two. Seven of the nine red deer elements were recovered in Area A Phase 5. Context (1152) contained a fragment of sawn antler. A humerus and astragalus were recovered from (1133); the humerus exhibited cut marks on the distal end of the shaft. A second humerus and a second phalanx were recovered from (1216); the humerus was hacked through the proximal end and central part of the shaft. Finally, a femur and mandible were found in (625), both of which displayed butchery marks. The femur was hacked through the shaft while the mandible had cut marks on the lateral diastema and was hacked through the ramus. A second red deer antler fragment was recovered from Area B, Phase 6 (2612) and a femur was found in Area A, Phase 7 (848) that had been chopped longitudinally through the distal epiphysis. Though recovered infrequently the consistent occurrence of butchery marks suggests that red deer were incorporated into the diet of the population if only on a small scale. Both roe deer fragments were recovered from the same pit fill layer (possibly used as a cess pit) in Area

Table 117 Area A, pig long bone fusion data.

Group	Element	Months	Fused	Unfused	% Fused
A	Proximal Radius	12	2	1	67
	Distal Humerus		4	1	80
	Pelvis		6	2	75
	Scapula		2	2	50
	2nd Phalanx		6	0	100
	Group Total		20	6	77
B	1st Phalanx	24	3	9	25
	Distal Tibia		1	5	17
	Distal Metacarpal		0	1	0
	Distal Metatarsal		0	1	0
	Distal Metapodial		0	11	0
	Calcaneus		0	8	0
	Group Total		4	35	10
C	Proximal Femur	42	0	6	0
	Distal Femur		0	2	0
	Proximal Ulna		0	0	na
	Distal Radius		0	8	0
	Proximal Tibia		0	4	0
	Proximal Humerus		0	2	0
	Group Total		0	22	0
Grand Total			24	63	87

Table 118 Area B, pig long bone fusion data.

Group	Element	Months	Fused	Unfused	% Fused
A	Proximal Radius	12	9	4	69
	Distal Humerus		1	2	33
	Pelvis		4	4	50
	Scapula		5	1	83
	2nd Phalanx		11	4	73
	Group Total		30	15	67
B	1st Phalanx	24	7	8	47
	Distal Tibia		0	9	0
	Distal Metacarpal		0	10	0
	Distal Metatarsal		0	0	na
	Distal Metapodial		1	16	5
	Calcaneus		0	15	0
Group Total	8	58	12		
C	Proximal Femur	42	0	8	0
	Distal Femur		0	4	0
	Proximal Ulna		0	7	0
	Distal Radius		0	4	0
	Proximal Tibia		0	4	0
	Proximal Humerus		0	3	0
Group Total	0	30	0		
Grand Total			38	103	141

A Phase 5 (1202=1216) where two red deer elements were recovered; neither exhibited butchery marks. The few metrics taken from red and roe deer are shown in Appendix 7. Deer remains were recovered in trace amounts at both Delamere Street and the fortress sites.

Dog

A total of fourteen fragments were identified as dog from Area A Phase 5 (625) (1126), Area B, Phase 6 (2498), (2500), (2513) and (2612), and Area A Phase 7 (992). A femur, two maxillary teeth and a vertebrae were recovered from (625), and a second femur and a radius were recovered from (1126). The elements found in B Phase 6 include a metapodial, tibia, maxilla and a third metatarsal. A juvenile atlas and axis vertebrae were recovered from (992). None of the dog elements exhibited evidence of butchery. Dog measurements are presented in Appendix 7.

Cat

Two cat fragments, a rib and a first phalanx, were recovered from Area A Phase 5 (1216) and (625) respectively. Neither fragment showed signs of butchery.

Hare

A total of 21 hare elements were recovered, the great majority from Area A Phase 5 (identified as brown hare (*Lepus europaeus*) by Ian Smith). Fifteen come from (1202)

= (1216) and include four 1st phalanges, two 2nd phalanges, a 2nd, two 3rd and a 4th metacarpal, as well as a 2nd, 3rd, 4th and 5th metatarsal – basically a couple of hare's feet. A scapula was also recovered with traces of a yellow-green deposit similar to that found in cess pits. Context (1160) held an astragalus and (625) a radius and a rib. In other phases, a hare tibia was found in A 4 (1273), a mottled grey clay layer, a pelvis from B 6 (2513), and a third metatarsal with signs of rodent gnawing from A 7 (126). None of the hare remains showed evidence of butchery, though there is little need for a knife when preparing a hare. Hare measurements are recorded in Appendix 7.

Most of the 'other mammals' were recovered from Area A Phase 5 suggesting that during this early phase of amphitheatre use the area was accessible for the disposal of a variety of animal waste. A common disposal location was the possible cess pit [(1202) = (1216)].

Small Mammals

The small mammal remains recovered from the Roman phases of the amphitheatre are summarised in Table 120. *Mus musculus* is the most commonly identified species, followed in a distant second place by *Microtus* sp. The majority of elements could not be identified beyond the level of Rodentia. Because of their secure dating and their relatively large NISPs (223 and 127) the small mammal remains from Area A Phase 5 (625) and Area B

Table 120 Micromammal summary: 3 = *Mus musculus*; 4 = *Rattus* sp; 5 = *Microtus* sp; 6 = *Microtus* cf *agrestis*; 8 = *Sorex* cf *araneus*; 20 = *Rodentia*

Area	Context	Sieve Size	# of Samples	Phase	NISP	Id	Species
A	126	4mm	1	7	2	2	20
A	126	na	1	7	4	3	20
A	129	2mm	1	7	4	2	20
A	131	2mm	1	7	1	0	20
A	133	2mm	1	7	1	1	20
A	134	2mm	1	7	3	2	3, 20
A	556	2mm	1	6	1	0	20
A	556	na	1	6	1	1	20
A	601	2mm	1	8	1	1	20
A	625	2mm	56	5	223	70	3, 4, 5, 8, 20
A	625	4mm	6	5	15	5	3, 4, 20
A	625	Flot	1	5	2	0	20
A	673	2mm	1	7	4	0	20
A	707	2mm	1	7	1	0	20
A	790	2mm	1	7	1	0	20
A	798	2mm	1	7	1	0	20
A	895	2mm	1	9	2	1	5
A	895	Flot	1	9	2	1	20
A	897	2mm	1	9	13	0	20
A	897	Flot	1	9	2	0	20
A	898	2mm	1	9	7	2	20
A	919	4mm	1	6	1	1	4
A	922	2mm	1	6	1	0	20
A	923	2mm	1	6	2	0	20
A	926	Flot	1	6	1	0	20
A	930	4mm	1	6	2	0	20
A	934	2mm	1	6	2	1	20
A	934	Flot	1	6	1	0	20
A	938	2mm	1	6	1	1	20
A	938	Flot	1	6	2	2	20
A	942	2mm	1	6	1	0	20
A	982	2mm	1	7	1	0	20
A	989	2mm	1	6	1	0	20
A	991	2mm	1	6	1	0	20
A	1022	2mm	1	6	2	2	6
A	1022	4mm	1	6	1	1	6
A	1061	2mm	1	5	1	0	20
A	1064	2mm	1	5	1	0	20
A	1073	2mm	1	5	2	0	20
A	1075	2mm	5	5	15	5	3, 20
A	1075	4mm	1	5	1	0	20
A	1082	2mm	1	3	2	0	20
A	1100	2mm	1	7	3	1	20
A	1100	4mm	1	7	1	1	20
A	1100	Flot	2	7	5	4	20
B	2450	2mm	3	6	4	1	3, 20
B	2450	4mm	1	6	1	1	20
B	2461	2mm	3	6	9	0	20
B	2466	2mm	1	9	2	0	20
B	2498	2mm	4	6	12	3	20
B	2498	4mm	5	6	14	5	3, 4, 5, 20
B	2513	4mm	1	6	1	0	20
B	2499	2mm	1	6	4	0	20
B	2499	4mm	1	6	1	1	20
B	2513	2mm	5	6	16	4	5, 20
B	2513	4mm	1	6	1	1	20
B	2543	2mm	28	6	127	31	3, 5, 20
B	2612	2mm	5	6	19	5	5, 20
B	2612	4mm	1	6	1	1	20
	Total		170		554	163	

Table 121 Area A, Site Phase 5, (625) and Area B, Site Phase 6 (2543) micromammal remains.

Element	A 5 (625) Species						B 6 (2543) Species		
	<i>Mus musculus</i>	<i>Rattus</i> sp	<i>Microtus</i> sp	<i>Microtus cf agrestis</i>	<i>Sorex cf araneus</i>	Rodentia	<i>Mus musculus</i>	<i>Microtus</i> sp	Rodentia
Right mandible	9	1				1	7	2	1
Left mandible	7	1	1	2	1		3		1
Mandibular incisors	2					1			1
Right maxilla		1		1			1		
Left maxilla	2			1			1		
Scapula	1					1	1		2
Ulna	3		1			4	1	1	
Radius	3					3	1		3
Humerus	8					3	4		4
Pelvis	1	1	1			2	2	1	
Femur	8		3			5	7		1
Tibia	3		2			7	4		1
Unidentified						132			77
Total	47	4	8	4	1	159	32	4	91

Phase 4 (2543) were compared (Table 121) to determine whether differences between site formation processes in the two areas could be distinguished. The high number of the commensal species *Mus musculus* indicates that the amphitheatre represented a safe place for these animals to nest. The lack of more 'wild' species in significant number indicates the amphitheatre was sufficiently removed from surrounding fields and grasslands to discourage the animals' travel between the two. Preservation of the micromammal bones in both contexts was good. In both (625) and (2543) elements, on average, were recovered 45 % complete indicating similar fragmentation intensities in both locations. A third of elements from (625) showed some amount of digestion whereas less than 10 % of elements from (2543) showed digestion. Minimal burning was witnessed on elements in (625) and none was recorded on elements from (2543).

Birds

The birds recovered at the amphitheatre are shown by phase in Table 122. The domestic fowl and woodcock elements recovered are shown in Table 123 broken down by phase. The elements are dominated by major limb bones; there is no bias towards fore or hind limb. Distal limb elements including phalanges and digits, and vertebrae were not recorded explaining their absence. The assemblages all appear to represent the remains of consumption waste derived from the preparation of whole birds. The domestic fowl and woodcock from context (625) is presented separately in Table 123 because of its relatively large NISP (46) and its importance as a well-sealed context associated

with activity immediately adjacent to the external wall of the first amphitheatre. All parts of domestic fowl and woodcock, except the skull and femur, are represented suggesting that meat-bearing portions of whole animals were disposed of in the area.

Domestic Fowl (Chicken)

Maltby (1997) has studied the prevalence of domestic fowl on Romano-British sites by comparing them with the sheep and pig assemblages. This method is followed here to allow for comparison with his data. Maltby concludes that, overall, domestic fowl are most common on urban and Romanised (typically military) sites during the period and that they are also common on sites where the pig population is high. The connection between pigs and domestic fowl might be due to the fact that both animals are convenient to breed within urban centres. There is a steady increase in domestic fowl in Area A relative to sheep and goat, and pig from Phase 5 (7 %) through Phases 6 (14 %) and 7 (29 %) (Table 124). It is tempting to argue that the increase in domestic fowl is linked to the progressive Romanization of the site through time. It should be noted that Area A Phase 6 has an NISP of <100 domestic fowl, sheep and goat, and pig bones. Domestic fowl is also common in Area B Phase 6 making up 21 % of the fowl, sheep/ goat, and pig group. The size range of the fowl bones at the amphitheatre suggests that both males and females were deposited making it likely that the birds were bred and raised locally for consumption though the nature of the site makes it possible cock-fighting was also a factor in their presence.

It is clear that domestic fowl was the bird of choice for

Table 122 Bird species by Area and Site Phase.

Taxon/Phase	A 5	A 6	A 7	A 9	B 6
Chicken (<i>Gallus gallus domesticus</i>)	4	2	13	1	14
cf Chicken (cf <i>Gallus gallus domesticus</i>)	28	6	50	3	90
Galliforms (Galliformes)	1	0	0	0	0
Rock Dove (<i>Columba livia</i>)	0	0	0	0	0
Greylag Goose (<i>Anser anser</i>)	0	0	1	1	0
Domestic Goose (<i>Anser anser domesticus</i>)	0	0	0	0	0
Goose Species (<i>Anser/Branta</i> sp)	2	0	0	1	2
cf Swan Species (cf <i>Cygnus</i> sp)	0	0	0	0	0
cf Mallard (<i>Anas</i> cf <i>platyrhynchos</i>)	1	1	0	0	1
Dabbling Duck (<i>Anas</i> sp)	0	0	0	0	0
Woodcock (<i>Scolopax rusticola</i>)	10	1	5	0	83
cf Woodcock (cf <i>Scolopax rusticola</i>)	15	2	5	0	12
cf Snipe (cf <i>Gallinago gallinago</i>)	0	1	0	0	0
cf Capercaillie (cf <i>Tetrao urogallus</i>)	0	0	0	0	0
Capercaillie (<i>Tetrao urogallus</i>)	0	0	0	0	0
Raven (<i>Corvus corvax</i>)	2	0	0	0	0
Jackdaw (<i>Corvus monedula</i>)	0	0	0	0	0
cf Blackbird (cf <i>Turdus merula</i>)	4	1	1	0	10
cf Song Thrush (cf <i>Turdus philomelos</i>)	2	1	0	0	4
cf Thrush (cf <i>Turdus</i> sp)	8	0	2	0	7
cf Starling (cf <i>Sturnus vulgaris</i>)	3	0	0	0	2
cf Starling sp (cf <i>Sturnus</i> sp)	4	0	0	0	2
cf House Sparrow (cf <i>Passer domesticus</i>)	1	0	1	0	2
Passerine (Passeriformes)	6	0	0	5	8
cf Buzzard (<i>Buteo buteo</i>)	0	0	0	0	0
Total	91	15	78	11	237
Percent Domestic Fowl	31	40	64	27	38
Percent Woodcock	27	20	13	0	40

consumption and deposition within the area immediately surrounding the first amphitheatre. Few sites in the country have as high a percentage of domestic fowl as seen in Area A Phase 7, the deposits which are certainly related to contemporary activities outside Amphitheatre 1b. The British site with the most similar pattern is the 1st to 3rd-century legionary bath at Caerleon. If the idea that the presence of post-holes and surfaces, possibly representing impermanent timber framed stalls, and fragments of portable ceramic ovens, immediately outside of the original amphitheatre may represent the selling of 'snack food' to

spectators (p 212) is correct, the high amounts of domestic fowl indicate it may have been the snack of choice. All meat-bearing parts of the birds and a few skulls were recovered indicating that whole carcasses were deposited in the area.

Woodcock

Applying the same analysis to woodcock it is shown that Area B Phase 6 has a high percentage of woodcock (20 %) relative to sheep and goat, and pig (Table 125). The amount of woodcock in Area A does not exceed 6 % in any phase suggesting a consistent pattern of woodcock deposition favouring the redeposited material of Area B. Wild game were being consumed in the vicinity of the amphitheatre with some frequency but were not a big seller at the amphitheatre itself. All domestic fowl measurements are shown in Appendix 7.

Amphibians

The amphibians recovered from the Roman phases of the amphitheatre are shown in Table 126. All identifiable amphibians belonged to either *Bufo* or *Rana* spp. though there were some elements that could not be identified beyond the level of Amphibia. Only 25 elements were recovered so little can be said about the amphibian remains other than no unusual species were recovered.

Conclusions

The faunal assemblage recovered from the Roman Phases at Chester amphitheatre provides a picture of animal use occurring in the immediate vicinity of the amphitheatre itself (Area A) as well as that occurring in the vicinity but not directly associated with the amphitheatre (Area B and aspects of Area A Phase 5). The major differences between the two areas are in the large amount of pigs recovered in Area B at the expense of numbers of cattle, and the large numbers of wild fowl (woodcock) recovered in Area B relative to Area A. Both assemblages represent the deposition of the mixed remains of consumption and butchery activity, but primarily consumption as shown by the abundance of meat-bearing elements. The amount of cattle recovered from both areas indicates that cattle would have provided the bulk of meat consumed in the area, though pig made up a high portion of the diet in Area B as well. An increase in both cattle and pig bones is common at Roman sites, particularly in the later Roman periods (King 1978). The high numbers of cattle and pig, particularly in Area B, as well as the high numbers of domestic fowl in both areas represent excellent examples of 'typical' Roman assemblages and speak to the very strong cultural influence of the local garrison on animal management in the area. The decisions behind the choices made by the population in terms of a shift in animal management from the native 'British' style are examined in detail by Cartledge (1991)

Table 123 Chicken and woodcock element breakdown by Site Phase.

A 5 (625)

Element/Taxon	N <i>cf</i> Woodcock (<i>cf Scolopax rusticola</i>)	<i>Scolopax rusticola</i>	<i>cf</i> Chicken (<i>cf Gallus gallus domesticus</i>)	Chicken (<i>Gallus gallus domesticus</i>)
Skull				
Coracoid	1	2	2	
Scapula			2	
Humerus		1		1
Radius	4	2	3	
Ulna		1	2	
Carpometacarpus	1		3	1
Sternum	1		2	
Pelvis	1		2	
Femur				
Tibiotarsus	1		5	
Tarsometatarsus	3	2	2	1
Total	12	8	23	3

A5 (1075) (1126) (1152) (1160) (1202) (1216)

Element/Taxon	N <i>cf</i> Woodcock (<i>cf Scolopax rusticola</i>)	<i>Scolopax rusticola</i>	<i>cf</i> Chicken (<i>cf Gallus gallus domesticus</i>)	Chicken (<i>Gallus gallus domesticus</i>)
Skull				
Coracoid		2		1
Scapula				
Humerus	1		1	
Radius				
Ulna				
Carpometacarpus				
Sternum				
Pelvis	1		1	
Femur				
Tibiotarsus	1		2	
Tarsometatarsus			2	
Total	3	2	6	1

A6(319) (516) (522) (708) (736) (934) (938) (1122) (1214)

Element/Taxon	N <i>cf</i> Woodcock (<i>cf Scolopax rusticola</i>)	<i>Scolopax rusticola</i>	<i>cf</i> Chicken (<i>cf Gallus gallus domesticus</i>)	Chicken (<i>Gallus gallus domesticus</i>)
Skull	1			
Coracoid			2	
Scapula			1	
Humerus		1		
Radius				
Ulna				
Carpometacarpus	1			
Sternum				
Pelvis			1	
Femur				1
Tibiotarsus			2	1
Tarsometatarsus				
Total	2	1	6	2

A 7 (126) (132) (134) (135) (555) (673) (707) (715) (716) (722) (738) (753) (755) (791) (795) (798) (805) (809) (875) (888) (894) (899) (1082) (1100)

Table 123 (continued) Chicken and woodcock element breakdown by Site Phase.

Element/Taxon	N <i>cf</i> Woodcock (<i>cf Scolopax rusticola</i>)	<i>Scolopax rusticola</i>	<i>cf</i> Chicken (<i>cf Gallus gallus domesticus</i>)	Chicken (<i>Gallus gallus domesticus</i>)
Skull			3	
Coracoid			7	
Scapula	1		2	
Humerus			7	1
Radius		1	6	
Ulna	1	2	3	
Carpometacarpus		1	5	
Sternum	1		4	
Pelvis	1		2	
Femur			2	4
Tibiotarsus	1		5	5
Tarsometatarsus		1	4	3
Total	5	5	50	13

B 6 (2450) (2498) (2499) (2513) (2542) (2543) (2552) (2612)

Element/Taxon	N <i>cf</i> Woodcock (<i>cf Scolopax rusticola</i>)	<i>Scolopax rusticola</i>	<i>cf</i> Chicken (<i>cf Gallus gallus domesticus</i>)	Chicken (<i>Gallus gallus domesticus</i>)
Skull	1		8	1
Coracoid		8	15	
Scapula	2	3	10	
Humerus		6	3	2
Radius	1	9	11	
Ulna		11	8	1
Carpometacarpus	2	11	5	2
Sternum	1	5	3	
Pelvis	1	2	5	
Femur	2	4	1	2
Tibiotarsus	2	8	10	
Tarsometatarsus		16	11	6
Total	12	83	90	14

for the area around Chester. The assemblages generally resemble those recovered from the nearby fortress much more than that from the *canabae*. The relatively few wild mammals recovered indicate that hunting was taking place but did not form a major part of the diet. Further evidence of Roman influence in animal use is found in the butchery pattern which shows a great bias towards the use of heavy chopping to break a carcass down into relatively equal size portions. It has been argued that this type of butchery is the result of fast, efficient military ration production (Grant 1989). There are numerous similarities in butchery marks across the three main domestic species of cattle, sheep and pig suggesting that a standard pattern of butchery was applied with small species-specific modifications enacted when appropriate. Mandibles of all species are chopped from the head and broken open in similar fashion. Limbs are often split transversely at the mid-point of the shaft and

joints are most commonly hacked through though there is more precise disarticulation and cut marks witnessed on sheep. Along with other limb bones the scapulae of all species are split in half, in a cranio-caudal direction. Because there is no marrow to access in the scapula the only reason for this practice is to break the body down into smaller packets. It is possible that the desire to create manageable packages of meat was the primary motivation for the splitting of long bones, rather than accessing the marrow cavity, though this resource may not have been overlooked. Finally, the amount of domestic fowl recovered in both areas is very high and also fits well with the idea of Roman animal use in Britain. There are very few sites in Britain during this period that have as much domestic fowl relative to pig and sheep/goat as seen at the amphitheatre assemblages and they are all either large urban settlements or have strong military connections such as the legionary

Table 124 Percentage of domestic fowl, sheep/goat and pig from the Amphitheatre and comparative sites. All data not from the amphitheatre is from Maltby 1997. %F percentage of fowl of total number of fowl, sheep/goat and pig bones; %S percentage of sheep; %P percentage of pig; FS percentage of fowl of total number of fowl and sheep/goat bones; FP percentage of fowl of total number of fowl and pig bones.

Site/Phase	%F	%S	%P	FS	FP	NISP
Chester Amphitheatre Area A Phase 5	7	45	48	13	12	470
Chester Amphitheatre Area A Phase 6	14	39	46	27	24	56
Chester Amphitheatre Area A Phase 7	29	37	34	44	46	218
Chester Amphitheatre Area B Phase 6	21	29	50	43	30	491
Chester, Northgate	14	30	56	32	20	348
Chester, Bridge Street	5	17	78	33	7	173
Chester, Delamere Street	4	37	60	9	6	287
Caerleon, Legionary Baths 1–3rd C	32	33	35	48	47	500
Caerleon, Legionary Baths 4th C	5	45	50	10	9	665
Caerleon, Museum Gardens	23	27	51	46	31	420

Table 125 Percentage of woodcock, sheep/goat and pig. %W percentage of woodcock of total number of woodcock, sheep/goat and pig bones; %S percentage of sheep; %P percentage of pig; WS percentage of woodcock of total number of woodcock and sheep/goat bones; WP percentage of woodcock of total number of woodcock and pig bones.

Area/Phase	%W	%S	%P	WS	WP	NISP
Area A Phase 5	4	46	50	9	8	458
Area A Phase 6	6	43	51	12	10	51
Area A Phase 7	6	48	45	11	12	165
Area B Phase 6	20	29	51	40	28	482

Table 126 Amphibian bones from Roman phases: 40 = *Amphibia*; 41 = *Anura*; 42 = *Rana/Bufo*; 43 = *Bufo* sp 44 = *Rana* sp; 45 = *Rana cf temporaria*.

Area	Context	Sample	Phase	NISP	Species	Elements
A	134	4014	7	1	44	metapodial
A	625	4172	5	1	41	unidentified
A	625	4710	5	1	41	unidentified
A	707	4156	7	1	41	phalanx
A	897	4641	11	1	44	urostyle
A	897	4641	11	1	41	unidentified
A	898	4643	11	1	45	ischium
A	898	4643	11	1	45	ischium
A	898	4643	11	1	44	maxilla
A	898	4643	11	1	43	ischium
A	898	4643	11	1	42	urostyle
A	898	4643	11	3	41	vertebrae
A	898	4643	11	1	44	atlas
A	898	4643	11	1	44	femur
A	898	4643	11	1	44	tibiofibula
A	926	4663	6	1	40	vertebrae
B	2513	4378	6	1	40	vertebrae
B	2543	4328	6	1	44	tibiofibula
B	2543	4329	6	1	44	tibiofibula
B	2543	4333	6	1	42	humerus
B	2543	4336	6	1	41	vertebrae
B	2543	4325	6	1	40	metapodia
B	2543	4335	6	1	42	scapula

bath at Caerleon. Despite being located in the far west of the country, away from the south-eastern heartland of Roman Britain, or perhaps because of this, the population living in the vicinity of the amphitheatre took great care to ensure their diet was distinctly Roman, or what passed for Roman at the edge of the empire. This was likely a deliberate act to differentiate themselves from the rural population but it also served practical purposes in terms of selecting species that provided good amounts of meat but could be raised within an urban setting such as pigs and chickens.

FISH BONE FROM ROMAN PHASES

By Jen Harland

Introduction

The Chester Amphitheatre excavations produced a substantial assemblage of over 20,000 fish remains dating from Roman to post-medieval phases. Much of this material was recovered as part of a comprehensive sieving strategy, and thus the fish remains are not biased towards hand collection of larger fragments. This report describes the fish remains from the Roman phases, while a second report will discuss the later material (see Volume 2 of this report). The Roman material comprises over 4,500 fragments, of which 1,490 were identified to species or larger taxonomic grouping.

The mammal and bird analysis investigated the extent to which Area A and Area B differs, and this question will also be asked of the fish assemblage. Area A includes at least 100 identified fragments from each of Phases 4, 5, 7 and 9, thus theoretically permitting a detailed examination of changes through these tightly dated sequential phases. General comments can be made for the small quantities from Phases 6 and 8. This substantial assemblage will be examined for changes through time and space regarding fishing species preferred, evidence for fishing methods and habitats exploited, differential element representation, cooking and preparation, and fish processing.

Roman fish remains from Britain have been the subject of a comprehensive review which used all available fish bone reports, and which examined regional variation and transitions from the Iron Age (Locker 2007). Locker used a total of 8,796 identified fish bones from 109 sites, many of which contributed only a few identifiable bones (Locker 2007, tables 4–10). Included in Locker's study were two previous investigations of Roman material from Chester: Dee House, producing a total of 116 identified bones (Jones 2001, an unpublished report cited in Locker 2007), and 25 Bridge Street, producing a total of 69 fragments (Jaques *et al* 2004, later summarised in Jaques *et al* 2008). A subsequent publication includes a further 3 fish fragments from Roman Chester (Baxter 2012). The amphitheatre assemblage is notably larger than any of the Roman assemblages discussed in Locker's review, and as such it provides a very useful addition to the zooarchaeology of Roman Britain. Two recent publications were not included in Locker's 2007 summary, both of which were exceptional fish processing sites containing the remains of thousands

of juvenile fish used for fish sauce production, one in the Thames Estuary and one in Dorchester (Hamilton-Dyer 2008, Nicholson 2012). These fish processing sites are exceptional because of the large quantity and minute size of the fish remains found in them, and although they will be discussed below, they are not directly comparable to the larger and more typical remains from the amphitheatre site.

Methodology

The fish remains were provided in ready-sieved bags marked by sieve fraction, including <2 mm, 2–4 mm, and >4 mm, as is standard practice. Every attempt was made at identifying even the <2 mm fragments, in case there was evidence for processing of tiny juveniles for Roman fish sauces. The fish remains were found in Phases 4, 5, 6, 7, 8 and 9, and in both Areas A and B. All were recovered by sieving aside from two hand collected fragments from Phase 7 and 41 fragments from Phase 5 that had no recovery specified (comprising several elements from a single small flounder head); these were simply grouped into the >2 mm fraction for ease of quantification. The 2–4 mm and >4 mm fractions have been combined as >2 mm here, for ease of comparison with other publications. The <2 mm fraction, comprising only 59 identified fragments, will be discussed separately where relevant.

This assemblage was recorded using the York System, an Access database utility designed for recording zooarchaeological assemblages. The extensive reference collection held by the Department of Archaeology, University of York, was used for identification purposes, while the imported Spanish mackerel fragments were kindly confirmed by Wim Wouters and Wim Van Neer using the reference collections held at the Royal Belgian Institute of Natural Sciences. The recording protocol is fully detailed in Harland *et al* (2003). Briefly, this entails the detailed recording of the eighteen most commonly occurring and easily identified elements, termed quantification code (QC) 1. For each of these, the element, species, approximate size, side, fragmentation, texture, weight and any modifications are recorded in detail. Fish vertebrae (QC2) are recorded in more limited fashion, with counts, element and species recorded. Some elements are unusual and particularly diagnostic, like otoliths, and are fully recorded (QC4). The final category of material (QC0) includes elements not routinely identified as well as unidentifiable material. Elements that are from very unusual species, or that are butchered, are recorded in detail even if not from the QC1 category.

Data analysis involved structured database queries, as well as manipulation using Excel.

Taphonomy

Fish remains were recovered from six phases and two areas in the Roman period, summarised by recovery method, type of element, phase and area in Table 127. The <2 mm assemblage is larger than expected in Phase 9, where these small fragments comprise 59 % of the <2 mm assemblage, yet only 5 % of the >2 mm assemblage. This difference will be investigated further to ascertain why there were so many tiny identifiable fragments in Phase 9 compared to earlier phases. The >2 mm fraction is considerable for Phase 5, which contains 48 % of the identified fragments, followed by Phase 6 in Areas A and B, both with just under 20 % of the identified fragments. Through all phases, the cranial and appendicular elements were outnumbered by vertebrae, as is to be expected when all parts of the fish are discarded, although this will be explored further below.

In order to understand whether variations in preservation can affect interpretations, percentage completeness and bone surface textures were calculated (Table 128). The assemblage is generally in very good condition. Two thirds of the bones had ‘good’ surface textures and almost none were classed as ‘poor’. Fragmentation was moderate. A quarter of all bones were almost whole, and none was less than 20 % complete. Phase 4 was generally in better condition and more complete than the later phases, although

the actual proportion of identified bones was lower in Phase 4 than all other phases.

Taphonomic modifications were low overall (Table 129). Just under 5 % of all Roman fish bone fragments were modified in some way. Crushing was the most common of these modifications, with 2.8 % overall. Crushing can result from chewing bones when they are fresh, and it leaves a very different look from later crushing once the bone is no longer fresh and malleable. Chewing was most common in Phase 5, with 4.8 % of fragments chewed. Carnivore gnawing was only represented by a single example from Phase 4, indicating dogs and other scavengers didn’t generally have access to the fish bones. Evidence for burning was very low, with only 0.3 % of fish bones calcined and 0.8 % charred overall, without any particular patterning by phase. Concretions were predominately found in Phase 5 (2.6 %). Only two modern breaks were noted from Phase 7, indicating post-excavation damage was negligible.

Description

Species

The >2 mm sieve fraction produced 27 different fish taxa, identified to species or to larger taxonomic grouping (Table 130; for full scientific names see Table 135). Flatfish are the most common in the Roman phases, with about 70 % of all the identified bones from this order (Pleuronectidae) (Fig 330). Flatfish are difficult to identify any more precisely than family level, although some cranial elements can be

Table 127 Fish bone: NISP and TNB by phase, area and recovery method; QC1 are cranial and appendicular elements, QC2 are vertebral elements, QC4 are unusual elements.

Phase Area		4 A	5 A	6 A B		7 A	8 A	9 A	Total
<2mm	QC1	2	2					2	6
	QC2	1	8		8	4		32	53
	NISP	3	10		8	4		34	59
		5 %	17 %		14 %	7 %		58 %	100 %
>2mm	Unidentified	185	287	13	80	54		103	722
	TNB	188	297	13	88	58		137	781
	QC1	52	96	13	29	18		6	214
	QC2	231	540	48	221	91	1	67	1199
>2mm	QC4	2	5		7	4			18
	NISP	285	641	61	257	113	1	73	1431
		20 %	45 %	4 %	18 %	7 %	0 %	5 %	100 %
	Unidentified	713	591	77	621	168	1	119	2290
All	TNB	998	1232	138	878	281	2	192	3721
	Total NISP	288	651	61	265	117	1	107	1490
	Total TNB	1186	1529	151	966	339	2	329	4502
	Percentage identified	24 %	43 %	40 %	27 %	35 %	50 %	33 %	33 %

Table 128 Fish bone: Percent completeness and surface texture for all QC1 and QC4 elements, all recovery.

Phase		4		5		6			7		9	Total	
Area		A		A		A	B		A		A		
Percent completeness	20–40 %	11	20 %	27	26 %	2	12	33 %	4	18 %	2	58	24 %
	40–60 %	13	24 %	33	32 %	3	9	25 %	11	50 %	3	72	30 %
	60–80 %	10	18 %	18	17 %	6	7	19 %	3	14 %	3	47	20 %
	80–100 %	21	38 %	25	24 %	2	8	22 %	4	18 %		60	25 %
Surface texture	Poor			2	2 %	1	1	3 %			1	5	2 %
	Fair	10	18 %	38	37 %	2	7	19 %	8	36 %	5	70	29 %
	Good	44	80 %	63	61 %	10	28	78 %	14	64 %	2	161	68 %
	Excellent	1	2 %									1	0 %
Total		55		103		13	36		22		8	237	

Table 129 Fish bone: Taphonomic modifications.

Phase	4		5		6				7		8	9		Total	
Area	A		A		A		B		A		A	A			
Modern breakage									2	0.6 %				2	0.0 %
Carnivore gnawing	1	0.1 %												1	0.0 %
Crushed	18	1.5 %	73	4.8 %	2	1.3 %	8	0.8 %	11	3.2 %		12	3.6 %	124	2.8 %
Calcined	3	0.3 %	4	0.3 %	1	0.7 %	2	0.2 %	3	0.9 %		1	0.3 %	14	0.3 %
Charred	1	0.1 %	24	1.6 %	3	2.0 %	4	0.4 %	1	0.3 %		2	0.6 %	35	0.8 %
Concretions	1	0.1 %	39	2.6 %										40	0.9 %
Total	24	2.0 %	140	9.2 %	6	4.0 %	14	1.4 %	17	5.0 %	0	15	4.6 %	216	4.8 %

identified to species. Here, only a single identification was from the turbot family, and the rest were from the halibut family. Within the latter, flounder and plaice were both routinely identified, as were single examples of halibut and long rough dab. It is likely that much of the flatfish that couldn't be identified to species are simply flounder and plaice. Eel is the second most common taxonomic grouping, representing about 15 % of all fish fragments found in the >2 mm fraction. Salmon and trout family were the third most common taxa, at 4 %, and similar to the flatfish they can be very difficult to identify to species. Here, these may include salmon, trout, sea trout and grayling. A single 'whitefish' identification is likely to be houting, a fish also known as powan or gwyniad (*Coregonus lavaretus*). Numerous other taxa were recovered, including: Atlantic herring, Atlantic mackerel, allis shad/twaite shad, smelt, Spanish mackerel, European sea bass, carp family, mackerel family, herring family, cod family, perch, whiting, grey mullet family, ray family, and sea scorpion family.

Spanish mackerel has been identified from Phases 4 and 6 (both areas A and B), all at low levels of 5 % or less (Fig 332). The Roman phases also contain several fragments that were classed as mackerel family could be either Spanish or Atlantic mackerel. Spanish mackerel is not naturally found in British waters (Froese and Pauly 2016) but was a known import during the Roman period and will be discussed further below. Spanish mackerel has also been identified (3 fragments) from medieval Phases 11 and 12 (Area A) and post-medieval Phase 14 (1 fragment), indicating a degree of residuality from Roman phases; this will be discussed further in the subsequent report detailing the post-Roman fish remains.

Some general trends between the Roman phases are apparent, although the small numbers of identified bones in each phase makes it difficult to perform a detailed comparison. Phase 5 is almost entirely composed of flatfish (87 %) and eels (7 %), with only a few other identifications. This phase shows less diversity than the earlier Phase 4 or

Table 130 Fish bone: Species by phase, >2 mm fraction, all elements.

	4		5A		6				7		8	9				
Taxa	A				A		B		A		A	A		Total		
Ray Family					p							1	1.4%	1	0.1%	
Eel	61	21.4%	44	6.9%	6	9.8%	49	19.1%	4	3.5%	1	43	58.9%	208	14.5%	
Allis Shad/ Twaite Shad	8	2.8%			8			3.1%	1	0.9%				17	1.2%	
Atlantic Herring	2	0.7%	1	0.2%	3	4.9%	5	1.9%	4	3.5%		19	26.0%	34	2.4%	
Herring Family	1	0.4%			1	1.6%	3	1.2%						5	0.3%	
Carp Family	1	0.4%			1	1.6%	6	2.3%						8	0.6%	
Smelt	11	3.9%			4			1.6%	2	1.8%				17	1.2%	
Whitefish					1	1.6%								1	0.1%	
Salmon & Trout Family	15	5.3%	12	1.9%	6	9.8%	18	7.0%	7	6.2%				59	4.1%	
Whiting			1	0.2%	1	1.6%					1	1.4%		2	0.1%	
Cod Family	2	0.7%	1	0.2%	1	1.6%			1	0.9%				5	0.3%	
Sea Scorpion Family	1	0.4%												1	0.1%	
European Seabass	1	0.4%	1	0.2%	7			2.7%						9	0.6%	
Perch														4	0.3%	
Perch?	1	0.4%												2	0.1%	
Grey Mullet Family	2	0.7%									4	5.5%		2	0.1%	
Atlantic Mackerel	2	0.7%									1	1.4%		25	1.7%	
Spanish Mackerel	2	0.7%	19	3.0%	1	1.6%	2	0.8%	1	0.9%				13	0.9%	
Mackerel Family	3	1.1%			3	4.9%	8	3.1%						7	0.5%	
Perciformes Order					1			0.4%	2	1.8%				1	0.1%	
Turbot Family	1	0.4%			1	1.6%								1	0.1%	
Flounder	5	1.8%												21	1.5%	
Flounder?	1	0.4%							1	0.9%				1	0.1%	
Halibut	1	0.4%	15	2.3%										1	0.1%	
Long Rough Dab	1	0.4%												1	0.1%	
Plaice	5	1.8%			5	8.2%	7	2.7%						20	1.4%	
Flounder/ Plaice	5	1.8%	3	0.5%			5	1.9%						15	1.0%	
Halibut Family	139	48.8%	4	0.6%	30	49.2%	129	50.2%	1	0.9%				915	63.9%	
Flatfish Order	11	3.9%	529	82.5%	1	1.6%	5	1.9%	84	74.3%	4	5.5%		28	2.0%	
QC2 elements not id'd to species	3	1.1%	7	1.1%					4	3.5%				7	0.5%	
			4	0.6%												
Total identified	285	100%	641	100%	61	100%	257	100%	1	13	100%	1	73	100%	1431	100.0%
Unidentified fish	713		591		77		621		1	68		1	119		2290	
Total	998		1232	1	38		878	2	81		2	192		3721		

the later phases. Phase 5 is the only one to have some bone material recovered from cess pits, as opposed to general surface spreads or dumps, and this difference in deposit type is one potential explanation. Phase 5 has a higher rate of crushed bone and a higher rate of concretions than other phases. Crushing can result from passage through the digestive tract of humans (and scavengers) and, obviously, it is only smaller bones from smaller fish that are swallowed because larger fish are easier to remove from the bone. There were traces of cess in these pits (p 86) which might explain this aspect. Cess pits can also include general kitchen and table waste that has not passed through the digestive tract. The variation in Phase 5 will be explored further below. Phase 9 is remarkably different from the preceding phases (Fig 333), with far fewer flatfish (6 %) and a much greater proportion of eel (59 %) and herring family fish (26 %).

Deposits of Phase 6 were excavated in both areas A and B. The fish remains are similar from both, allowing for the small quantity recovered from area A. Flatfish make up just over half of both areas, with significant quantities of eel, salmon family and Spanish mackerel fragments also found. It is therefore likely that similar fishing methods and food preparation contributed to both areas, although this will be discussed further below when considering fish sizes.

The <2 mm sieve fraction only contained 59 identifiable bones (Table 131), most of which were vertebrae from species which can be caught when small but which are readily identifiable. A total of nine species or larger taxonomic groupings were identified, all of which were already identified in the >2 mm fraction. Eel was most common, representing about half of the identified bones in this sieve fraction; even a sizable eel with food value can have very tiny bones. A variety of other taxa were

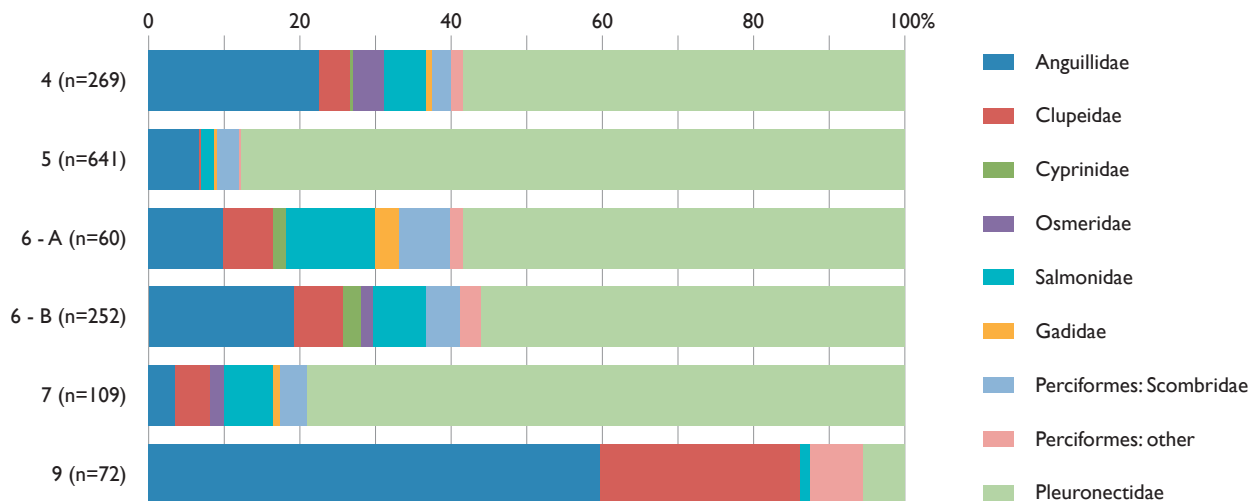


Fig 330 Proportions of major fish families/orders for major phases, >2 mm fraction; minor families not included in totals.

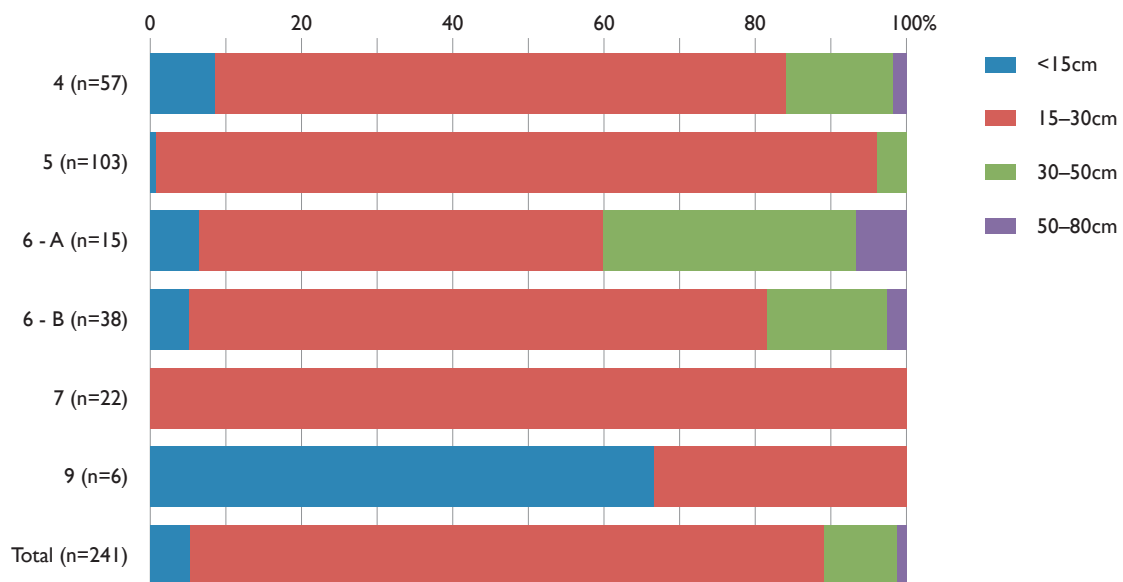


Fig 331 Fish sizes by phase, >2 mm fraction.

recovered, including smelt and perch, both of which tend to be small, and flatfish, which can be caught when small though which have a limited food value. It is possible some of these were stomach contents from larger fish; this will be considered below when discussing fish sizes. Over half of these small bones were identified from Phase 9, a phase which otherwise contained relatively few fish remains from the >2 mm fraction. Very small fish remains from Roman era sites can be indicative of fish process to create fish sauces, but this is not the case here, as the species represented are not those preferred for fish processing (see comparative sites below). However, the difference in species composition in this final phase would suggest that this 3rd-century material from the use of Amphitheatre 2

indicates changing preferences for fish, or different fishing strategies, compared to the 1st and 2nd centuries.

Fish sizes

Total length estimates recorded for all QC1 and QC4 elements, using reference collection comparative skeletons. Total sizes were not generally recorded for QC2 (vertebral) elements as they are difficult to attribute to size for flatfish, although some of the larger vertebrae from some families (eg cod family) did have sizes recorded; this is of greater relevance to the fish remains from the medieval period and will be discussed further in the forthcoming report. A total of 241 bones had sizes recorded from the >2 mm fraction, and of these, 84 % were fish of 150–300 mm total length

(Table 132). A further 10 % were fish of 300–500 mm total length, 5 % were <150 mm total length and a further 1 % were fish of 500–800 mm total length. Overall this assemblage consists of fish that were fairly small and each would only have provided only one or two meals; this is in marked contrast with the focussed fisheries for larger cod family fish in the medieval period where each fish could provide dozens of meals. Sizes for individual species are shown by phase in Table 132. The flatfish,



Fig 332 Spanish mackerel vertebrae, Phase 5, (625) (upper) and Phase 6, (2498) (lower), scale 1cm.

which make up the majority of most phases, are almost entirely 150–300 mm total length. The few that are less than 150 mm total length may have been stomach contents from larger fish. A few fish were sizable at 500–800 mm and could have provided a large amount of food, including a specimen from the salmon and trout family, a European sea bass, and a Spanish mackerel.

Fish bone measurements were recorded for relevant elements and are listed in Table 133. The three eel measurements have had regression equations applied and therefore have accurate total length estimates provided: results indicate total lengths of 26 cm, 30 cm and 53 cm. These are consistent with the fish size estimations. Numerous measurements have been recorded for the flatfish, but as yet there are no regression equations that can turn these measurements into total length estimates.

A total of 6 bones could be sized from the <2 mm fraction. Of these, 1 was from a <150 mm total length halibut family fish from Phase 4, and the rest were all 150–300 mm total length Atlantic herring, eel, halibut family and perch family spread across the phases. Aside from the tiny halibut family fish, the others could all have been fish deliberately caught for food. The tiny halibut family fish could have been stomach contents from larger fish. Many of the vertebrae found in this fraction could also have been stomach contents, indicating there may have been some small-scale gutting and fish processing taking place. However, many of the fish found within the Roman phases were either unlikely to eat fish (eg plaice (Froese and Pauly 2016)) or would have eaten such tiny fish that they would have been unlikely to appear even in the



Fig 333 Typical sieved samples showing changing nature of Roman deposits in the 3rd century. Left image shows a typical sample from Phases 4 to 7 (sample <4381>, context 2612, Phase 6), and right shows a sample from Phase 9 (sample <4643>, context 898), scale 1cm.

Table 131 Fish bone: Species by phase, <2 mm fraction, all elements.

Taxa	4 A	5A	6		7 A	9A	Total
			A	B			
Eel	2	5		3	1	19	30
Atlantic Herring		1			1	1	3
Carp Family				1			1
Smelt		1		1		2	4
Cod Family					1	1	2
Perch						6	6
Perch Family						2	2
Halibut	1	2		2		2	7
Family Flatfish order		1		1	1	1	4
Total identified	3	10		8	4	34	59
Unidentified fish	185	287	13	80	54	103	722
Total	188	297	13	88	58	137	781

<2 mm mesh size (eg flounder (Froese and Pauly 2016)), and therefore even if gutting was taking place, this would leave few traces.

Did fish sizes change through time? The assemblage is small, and conclusions are therefore tentative. Small fish were common throughout, with some slightly larger ones found in Phase 6 and a few in Phase 4. However, as shown in Figure 331, Phase 9 contains smaller fish than previous phases, continuing the trend observed above indicating fishing and fish consumption changed in the 3rd century.

Element proportions

Different proportions of heads or vertebrae could be indicative of fish processing, or kitchen *vs* table waste. Here, the relatively small size of the assemblage in each phase makes it difficult to quantify heads and bodies, but in general all elements are present in expected proportions (Table 134). Vertebrae are generally expected in greater quantities than cranial elements, owing to the greater number of vertebrae in each animal. The flatfish appear to have been deposited whole – eg with expected proportions of cranial and vertebral elements. Flounder and plaice vertebrae are difficult to identify to species and are thus generally attributed to halibut family, which explains the otherwise odd bias shown in the table towards cranial-only elements for these two species. The imported Spanish mackerel is represented by both cranial and vertebral elements.

Butchery and pathology

No butchery marks were noted, although a single mackerel family vertebra from Phase VII may have been chopped in the transverse plane as though making mackerel steaks. This was a large specimen but the poor quality of preservation meant it could not be positively identified as Spanish or Atlantic mackerel. However, one could speculate that it was part of a prepared and preserved shipment of Spanish mackerel. No pathologies were noted.

Discussion

The Roman fish remains from Chester are a substantial assemblage and therefore questions can be asked about cuisine and cooking, habitats exploited, possible fishing methods, and comparisons with other assemblages from Roman Britain. The sequence gives us insights into Roman diet from the initial period of Roman settlement (Phase 4), from the use of the first amphitheatre *c* AD 71–100 (Phase 5), from remodelling *c* AD 100 (Phase 6), and from later use in the 2nd century (Phase 7) and then the final use in the third century (Phase 9). This sequence is unprecedented in the study of Roman fish remains in Britain, both for the quantity of material and for the tightly dated sequence.

Habitats and fishing methods

The river Dee, is a freshwater river system that is now one of the most regulated in Europe (Wessex Archaeology 2006). Chester is about 15 km from the mouth of the Dee where the river opens up into its estuary, a tidal basin of considerable conservation interest today. The river was tidal at least as far as Chester (p 2), and occasionally further upstream (Coward 1910, xiii), and in the Roman period it was likely that substantial vessels could easily reach Chester (Halcrow Group Ltd. 2013). Potential local fishing effort would therefore produce a mix of freshwater and brackish water species from the river immediately around Chester, plus estuarine fish as well as some fully marine species from the outer reaches of the Dee Estuary, from Liverpool Bay, which is fed by the Dee and other rivers, and from the deeper waters of the Irish Sea.

All of these potential fishing grounds would have been easily accessible to the inhabitants of Chester, without having to resort to preservation methods or trans-shipping. For species with known habitats, total NISP has been plotted by phase and habitat (Fig 334).

Historical and antiquarian sources list fish commonly found in the River Dee prior to 20th-century industrialisation, thus providing a useful guide to which species may have

Table 132 Fish bone: Fish sizes by phase and taxa, >2 mm fraction.

Taxa	Total length estimate (mm)	4 A	5 A	6 A B	7 A	9 A	Total
Eel	<150			1			1
	150–300	4	6	1			11
	300–500	1	1	1			3
Allis Shad/ Twaite Shad	300–500			1			1
Atlantic Herring	150–300	1				1	2
Herring Family	300–500			1			1
Salmon & Trout Family	<150					1	1
	300–500			1			1
	500–800			1			1
Whitefish	300–500			1			1
Cod Family	<150			1			1
	150–300	1					1
European Seabass	150–300	1					1
	500–800			1			1
Perch	<150					1	1
Perch?	<150					1	1
Atlantic Mackerel	150–300	1	2				3
Spanish Mackerel	300–500			2			2
	500–800	1					1
Mackerel Family	300–500	1					1
Flounder	150–300	4	15		1		20
	300–500	1					1
Flounder?	150–300	1					1
Halibut	150–300	1					1
Long Rough Dab	<150	1					1
Plaice	150–300	4	2	4			17
	300–500	1	1	1			3
Flounder/ Plaice	150–300	3	4	5	1		13
	300–500	2					2
Halibut Family	<150	4	1	1		1	7
	150–300	22	69	4	16	1	132
	300–500	2	2	3	20		7
	Total	28	72	4	20	2	146

been present in the Roman period. The Dee was known as a salmon river “of some importance”, producing both salmon and trout in the river itself rather than the estuary (Walker, 1893, 1; Coward 1910, xiii; Johnstone 1910, 43, 143). Trout were also common upriver and in the Dee’s tributaries (Johnstone 1910, 149), but because their bones cannot easily be distinguished from sea trout, salmon and grayling, it is impossible to ascertain if they were being fished. Eel was abundant in all English and Welsh rivers,

including the Dee, until recent centuries (Dekker and Beaulaton 2016; Johnstone 1910, 137). They tend to be ubiquitous in most British archaeological assemblages, and they were present in low levels in most phases at Chester. Only in the 3rd century Phase 9 did they become a preferred species. Pike were present historically on the Dee, though only in the upper reaches about 10 to 12 miles upriver from Chester (Johnstone 1910, 148, 132) – which probably explains their absence here. Various members of the carp

Table 133 Fish bone: Fish measurements with regression equation results.

Taxa	Element	Phase	Area	M1 (mm)	M2 (mm)	M3 (mm)	Total length (mm)	Reference for regression
Eel	Cleithrum Dentary	4	A	0.93			263	Thieren <i>et al.</i> 2012 Enghoff 1994
		4	A	1.08	299			
				2.02	525			
Salmon & Trout Family	Quadrate	6	A	3.58				
Flounder	Premaxilla	5	A	2.89	1.26	6.93		
	Quadrate	5	A	3.25				
Plaice	Quadrate	4	A	1.92				
				2.77				
		6	A	2.4				
Flounder/ Plaice	Dentary	5	A	4.11				
	Quadrate	5	A	2.75				
Halibut Family	Basioccipital	5	A	3.55	3.22			
				3.95	3.71			
				4.14	3.87			
				4.65	4.19			
		6	A	5.16	4.5			
			B	5.97				
	Quadrate	4	A	2.1				
		5	A	2.05				
				2.28				
				2.48				
				2.51				
				2.59				
				3.03				
				3.17				
		6	B	2.6				
		7	A	2.54				
				2.79				

family were common on the Dee, including gudgeon, tench, dace, chub, roach and bream (Johnstone 1910, 139–142). These species are present at the amphitheatre site only in small quantities, suggesting they were not sought after. Lamprey are also known historically in the Dee and they were most likely abundant (Johnstone 1910, 167), but these primitive jawless fish leave only a tiny tooth-plate behind, which is almost never found archaeologically. Smelt used to be very abundant on the Dee (Johnstone 1910, 151), although this fish will inhabit freshwater, brackish and marine waters (Froese and Pauly 2016) so the finds from Chester could have been caught in a number of potential fishing grounds.

Liverpool Bay contains numerous marine species, including some that are migratory and that may only be in the shallower, inshore waters of the Dee estuary when juvenile or at certain times of the year. In the 19th and early 20th-century plaice were commonly caught by small trawlers in the channel areas of the estuary (Johnstone 1910, 40). The sandy expanses of the Estuary and Liverpool Bay produced a variety of flatfish by trawling, including considerable quantities of dab, as well as plaice, soles

and, further up the estuary, flounder (Johnstone 1910, 46). The small quantities of dab and the lack of soles found here would suggest fishing rarely extended further out in Liverpool Bay during the Roman period. Both flounder and plaice were commonly found in the amphitheatre assemblage, and although flounder are indeed common in freshwater (eg higher up the estuary or in the River Dee), plaice prefer brackish water and are not found in freshwater (Froese and Pauly 2016). They are both identified to species level in small numbers in some phases. Many of the halibut family identifications are likely from flounder and plaice, but they are difficult to identify to species. Atlantic herring and the closely related shads were found in low numbers in several phases. The shads migrate between freshwater rivers, estuaries and coastal waters (Froese and Pauly 2016), whereas herring remain in coastal waters (Froese and Pauly 2016). Herring were recorded historically as common taxa in Liverpool Bay and shads were present but rare (Johnstone 1910, 54, 157), but both appear to only be sporadically caught in Roman times. This is further confirmation that fishing in the Roman period did not routinely encompass the more open waters of Liverpool Bay, where herring

Table 134 Fish bone: Element counts for major taxa, > 2mm fraction.

Taxa	Element	4	5	6		7 A	8	9	Total
		A	A	A	B		A	A	
Eel	Articular		2		1				3
	Basioccipital		1						1
	Ceratohyal		1						1
	Cleithrum	1	1						2
	Dentary	3	2						5
	Premaxilla				1				1
	Vomer	1			1				2
	Abdominal Vertebra	29	22	1	11	1		17	81
	Caudal Vertebra	27	15	5	35	3	1	26	112
	Total	61	44	6	49	4	1	43	208
Atlantic Herring	Basioccipital							1	1
	Preopercular	1							1
	Abdominal Vertebra	1	1	1	3	2		14	22
	Caudal Vertebra			2	2	2		4	10
	Total	2	1	3	5	4		19	34
Smelt	Abdominal Vertebra	3			1	2			6
	Caudal Vertebra	8			3				11
	Total	11			4	2			17
Salmon & Trout Family	Articular							1	1
	Quadrate			1					1
	First Vertebra	1							1
	Abdominal Vertebra	6	1	3	8	3			21
	Caudal Vertebra	8	11	2	10	4			35
	Total	15	12	6	18	7		1	59
Atlantic Mackerel	Hyomandibular		1						1
	Preopercular		1						1
	Abdominal Vertebra	2	8		1	1			12
	Caudal Vertebra		9	1	1				11
	Total	2	19	1	2	1			25
Mackerel Family	Scapula	1							1
	Abdominal Vertebra	2			1				3
	Caudal Vertebra					3			3
	Total	3			1	3			7
Spanish mackerel	Hyomandibular			1					1
	Opercular Abdominal			1					1
	Vertebra Caudal				1				1
	Vertebra	2		1	7				10
	Total	2		3	8				13
Flounder	Articular	1	2						3
	Cleithrum	2							2
	Dentary	1	2			1			4
	Infrapharyngeal		1						1
	Maxilla		3						3
	Parasphenoid		1						1
	Premaxilla	1	3						4
	Preopercular		1						1
	Quadrate		1						1
	Vomer		1						1
	Total	5	15			1			21

Plaice	Articular			1				1
	Ceratohyal	1	1	1				3
	Cleithrum				2			2
	Dentary	1	2		1			4
	Hyomandibular				1			1
	Maxilla			1				1
	Premaxilla	1			2			3
	Preopercular			1	1			2
	Quadrate	2		1				3
	Total	5	3	5	7			20
Flounder/ Plaice	Articular	2						2
	Ceratohyal	1						1
	Cleithrum	1			1			2
	Dentary		1					1
	Maxilla		1					1
	Premaxilla					1		1
	Quadrate		1		1			2
	Supracleithrum	1			1			2
	1st Anal Pterygiophore		1		2			3
	Total	5	4		5	1		15
Halibut Family	Articular	5	8	1	3	4		21
	Basioccipital		7	2	1	1		11
	Ceratohyal	1	4			1		6
	Cleithrum		7			2		9
	Dentary	3	4		3	1		11
	Hyomandibular	2	4			2		8
	Infrapharyngeal					1	1	2
	Maxilla	1	4					5
	Opercular	1	6		1			8
	Palatine	2			1			3
	Parasphenoid		1					1
	Posttemporal	1	5		1		1	8
	Preopercular	2	5		3	2		12
	Quadrate	3	11	1	1	2		18
	Scapula	2						2
	Supracleithrum	3	2		1			6
	First Vertebra		2	1				3
	Abdominal Vertebra	36	149	7	37	18	1	248
	Caudal Vertebra	74	306	16	71	45	1	513
	Ultimate Vertebra	1	2	2	1	1		7
	1st Anal Pterygiophore	2	4		5	4		15
	Total	139	551	30	129	84	4	937
Flatfish Order	First Vertebra	1	1					2
	Abdominal Vertebra	6	6			2		14
	Caudal Vertebra	3			5	2		10
	Ultimate Vertebra	1		1				2
	Total	11	7	1	5	4		28

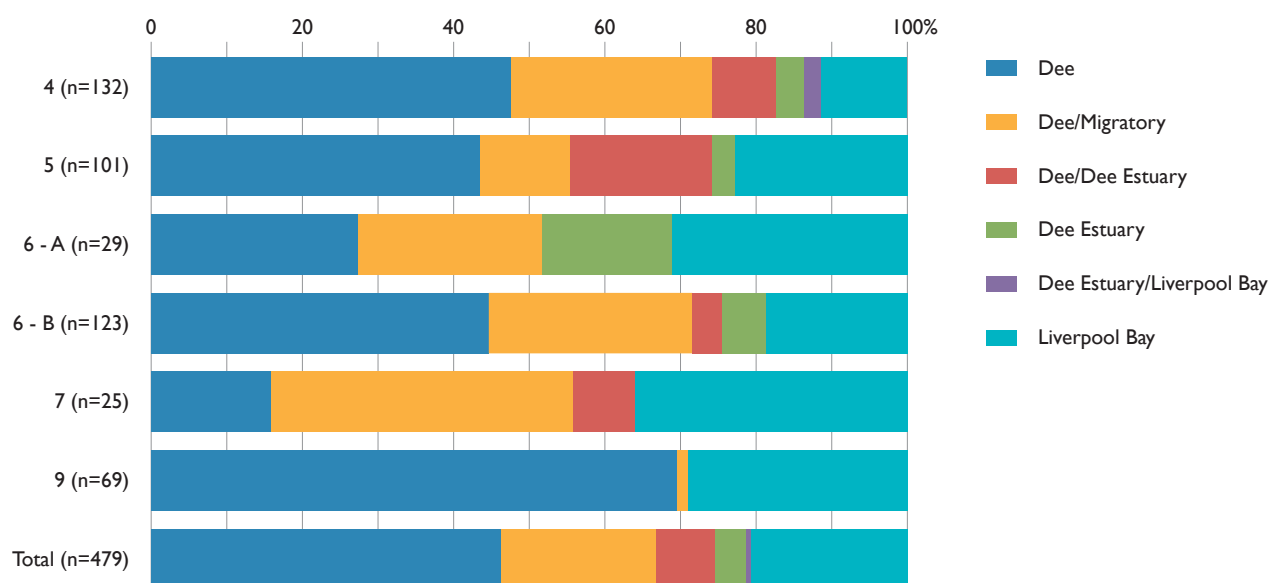


Fig 334 Local habitats exploited (excluding imports and fish only identified to taxonomic order).

would have been a plentiful, if seasonal, catch. It is only in the 3rd century that herring family fish are caught in any quantity (representing about a quarter of all identifications in Phase 9), probably showing a change in fishing methods or preferences in this final period.

Whiting and other cod family fish are marine taxa, and as such are unlikely to be found in the upper reaches of the estuary where water is less salty (Froese and Pauly 2016). Any catches were therefore probably from the more marine outer reaches of the Dee Estuary or in Liverpool Bay. Whiting has been recorded as the most common cod family fish found in Liverpool Bay (Johnstone 1910, 54), consistent with the few species-level identifications of this family from Roman Chester. Younger cod family fish are more likely to stay close to the coasts in shallow water, while the larger more mature animals are found in deeper open water and then more often in the winter months (Johnstone 1910, 107, 111, 115). The lack of any larger, mature cod family fish in the Roman layers at Chester would suggest no exploitation of open waters, and the few identifications here are likely to be young cod family fish that strayed into the outer reaches of the Dee Estuary or the inshore area of Liverpool Bay. The two small cod family fragments identified here were probably juveniles caught in the outer reaches of the estuary, in an area otherwise rarely exploited in Roman times.

Some marine fish species were only seasonally present in Liverpool Bay. Both seabass and mackerel, for example, are only found in the summer months (Johnstone 1910, 62, 66). Young whiting and cod were more common in the autumn, as were the more mature (ie larger) plaice (Johnstone 1910, 46). Overall however, Roman era fishing may well have taken place year round, exploiting whatever species were available locally.

As shown in Figure 334, the Dee and its estuary account for about 80 % of fish from the Roman phases, with some variation through time. The earliest phase (4) shows the least amount of fish from Liverpool Bay, while there are some increases in the later periods. However, there is no one pattern of exploitation. Even when species have been recorded as likely to be from Liverpool Bay, the small sizes recovered probably indicate safer, inshore fishing only without exploiting any of the deeper waters of the Irish Sea. Even if fishing tended to be very local, we can still see some preference over chosen species. Purely freshwater fish, like the carp family and perch, would have been present in the Dee, probably in some quantity, yet their bones are only found in trace amounts. Eel, salmon and trout, on the other hand, were recovered in high proportions. It may be that carp and perch were actively avoided.

Roman fishing methods are relatively well understood as they are illustrated in mosaics and discussed in historical texts (Bekker-Nielsen and Casasola 2010). However, the actual fishing methods used in Chester are more difficult to discern. Fishing from the shore using stake-nets was commonly used to catch flatfish in the upper reaches of the Dee Estuary (Johnstone 1910, 77). Trammel nets were also used in recent centuries, stretched across the lower reaches of the river and the start of the estuary; these nets were primarily used to catch migrating salmon (Walker 1893, 3–4). Small coracles were used in the Dee until the 19th century, using nets strung between the small craft to catch any passing fish (Walker 1893, 2). Fishing from boats using hooks and lines could have caught the (few) small cod family fish in the outer reaches of the Dee Estuary, although these were rare and could indicate this was not a preferred fishing method. Fish traps and fish weirs are known from recent centuries along the Dee (O’Sullivan

2004, 454–55) but their antiquity is not known. Roman fishing was known to use spearing, hook-and-line, seine fishing from boats or from the coast, casting-nets from the shore or from boats, and fish traps and other forms of ‘passive’ fishing (Bekker-Nielsen 2010, 188–89, table 1), and a combination of all of these may well have been used in the varied habitats around Chester. Roman fishing could include everything from small-scale solitary fishing, up to professional-level team exploitation involving considerable risk and investment (Bekker-Nielsen 2010); what we are seeing at Chester may include organised and professional fishing, in order to supply a routine market demand for specific species, without exploiting the deeper and riskier waters of the Irish Sea area.

Comparative assemblages

Chester has been the focus of many archaeological investigations, but few have produced fish remains for comparison with the amphitheatre material. Saxon excavations within the Roman fortress area in the 1970s and early ’80s produced some material of residual Roman date, but sieving was not undertaken and no fish remains were reported (Cartledge 1994). Excavations at 3–15 Eastgate Street produced Roman period animal bones, but with only a low level of sieving; a total of six fish bones were noted, without species attributions (Harrison 1995, 50, 52, table 12). A small assemblage of 1st and 2nd century AD date in the *canabae legionis* produced only three fish fragments from sieved samples, and none from hand collection (Baxter 2012). These included flatfish vertebrae, consistent with the pattern emerging from the amphitheatre site. The lack of fish there probably relates more to the small amount of sieving undertaken, rather than any taphonomic or economic trend (Baxter 2012).

Excavations at 25 Bridge Street, in Chester, produced a moderate quantity of Roman era fish remains, all of which were derived from sieved deposits, including a small assemblage of 69 identified fragments dated late 1st century to early 4th century AD and thought to represent occupation within the fortress (Jaques *et al* 2004, later summarised in Jaques *et al* 2008). Barring a few hand collected bones not fully quantified, these were entirely from sieved samples (Jaques *et al* 2004, 5) and they are therefore directly comparable to the present assemblage. Mullet family fish accounted for half of the identifications. Flatfish, including flounder/plaice, were the second most common identification, followed by eel. Other taxa noted were herring, salmon, and ?Spanish mackerel (Jaques *et al* 2004, table 11). The predominance of mullet is unusual, but it appeared two entire fish were deposited whole, accounting for their apparent popularity (Jaques *et al* 2004, 6); they may instead have been rejected and disposed of whole, skewing the counts. The other taxa found here are broadly consistent with our Phases 4 to 7, though the 3rd-century Phase 9 differs from these comparative assemblages.

A second phase at 25 Bridge Street produced a further

196 identified fragments, dating to the 4th century to c 900 AD. Here, the flatfish represented half the identified bones, followed by herring at about a fifth. Others present included smelt, at just under 10 %, and trace quantities of shads, salmon family, eel, cod family, (including whiting and cod), bass and mullet family (Jaques *et al* 2004, table 11). Both cranial and vertebral elements were recovered. A single ?Spanish mackerel was also found (Jaques *et al* 2004, table 11), which was questioned as possibly residual from the earlier and more tightly dated Roman phase. These probably represented waste from both food preparation and table waste, all deposited together (Jaques *et al* 2004, 7). The higher proportion of herring seen here is not directly comparable to amphitheatre Phases 4 to 9, and suggests a more marine-focussed fishing effort for herring that was probably of post-Roman date. However, the 3rd-century Phase 9 does contain a higher proportion of herring than all earlier phases, suggesting that a rise in herring exploitation may be a marker for changing fishing preferences towards the end of the Roman period.

Fish bone from the Dee House excavations dated to the 1st to 3rd centuries AD. 116 identified fish remains, are assumed to be derived from sieving (unpublished report by AKG Jones, cited in Locker 2007). There, 36 % of the bones were salmon family, 24 % were halibut family, 20 % were eel, 15 % were smelt, and herring family represented the final 5 %. These are not dissimilar to the amphitheatre assemblage and the early phase at 25 Bridge Street, although all of these comparative assemblages are fairly small.

The picture emerging from Roman Chester is one of localised fishing for fresh fish from the River Dee and from the Dee estuary, with only occasional fishing in the outer reaches of the estuary and very little fishing in the open waters of Liverpool Bay. The deeper water of the Irish Sea region was avoided. These fish from the local river and the estuary could all be landed at Chester without any need for preservation. Small quantities of imported Spanish mackerel are apparent, both in Chester Amphitheatre and at 25 Bridge Street, and will be discussed below. The 3rd-century phase shows a much greater reliance on eel and herring family fish, rather than the flatfishes preferred earlier. The fishing grounds may not have changed, but fishing methods or fishing preferences altered at some point in the late 2nd century.

The fish from the amphitheatre site are not biased towards over-representation of any one part of the body, and barring the few Spanish mackerel, there is no suggestion that these are specialised fish processing deposits. Instead we are likely seeing the remains of freshly caught fish, eaten locally quickly after capture, without needing to use any form of preservation. The lack of butchery and the even proportions of crania and vertebrae could indicate that these fish were cooked whole, served on the bone, and then the table waste was disposed of with other rubbish. Some of these bones found in Phase 5 ended up in cess

pits, either having passed through human digestive systems or because they were disposed of there. All other phases contain refuse found in surface layers, general dumps or deposited contexts. Some of these were probably associated with temporary stalls selling produce at the amphitheatre, which leads to questions as to whether these fish could be considered ‘fast food’. The lack of butchery evidence and the presence of all elements of the fish indicate they were being served whole, on the bone. Small, delicate flatfish predominate throughout Phases 4 to 7, and these were fish that would not – from our point of view, at least – be readily consumed as fast food. However, they could have been served at stalls for eating a quick sit-down meal.

Roman period fishing has been summarised by Locker (2007), whose research involved examining all published and archival reports of fish remains in Britain. Most of these sites only produced small assemblages of fish bones; of the 109 sites described, a total of 8,800 fish bones were identified (Locker 2007, 144). Leaving aside the unusual ‘fish sauce’ deposits, the fish remains from Chester Amphitheatre are the largest assemblage from the UK to date, including recent publications from Victoria Road East, Winchester (Bullock 2010) and London Amphitheatre Guildhall Yard (Liddle 2008). Only 1 site has >1,000 identified fragments: 17 Fish Street/Monument Street, EC3 London, which dates to the 1st century AD and produced 1,226 identified fragments (Locker 2007, 162, table 7). The Fish Street assemblage was a rubbish pit formed from a disused well, and it contained many locally-caught freshwater or estuarine species indicating local exploitation of available species (Locker 2007, 157).

Locker investigated changes from the fish-avoiding Iron Age (see Dobney and Ervynck 2007), and she examined the cultural and dietary influence of Rome on the local population, both during the initial occupation and in the subsequent assimilation over the centuries (Locker 2007, 141). Cooking styles changed with the introduction of Roman cuisine, with fish becoming acceptable as a foodstuff again. Frying pans became a common method of cooking (Locker 2007, 143, 157) and one which is well suited to many of the fish found in Chester; these are primarily small and suitable for cooking whole, and the lack of butchery marks would suggest this method of cooking was used.

Chester is not the only amphitheatre site in Roman Britain to produce fish remains. Excavations on the site of London’s amphitheatre produced a lot of well sieved animal bone, but only 15 fish could be identified to species. Several hundred more were noted as unidentified along with unquantified fish scale deposits. Much of the mammal bone recovered was classed as butchery waste from an organised system of beef production, rather than table waste, and it was suggested by the analyst that the presence of fish scales could imply this too was processing waste but that much of the fish would have been served at table on the bone, and disposed of elsewhere (Liddle 2008, 215).

Fish consumption in the Roman era was linked with

status and much is known about cookbooks, cuisine, aquaculture and the relative values placed on different fish species in the Mediterranean region (Bekker-Neilsen 2010, 198), though how this value system came to be applied to the outer reaches of the empire is less well understood. Isotopic analysis of human remains from Roman Britain show variation in marine protein consumption, with hints that it correlates with males and higher status individuals (Müldner 2013). It would appear that the larger cod family fish – which would have been plentiful in coastal and deeper waters all around Britain – were generally avoided at most Roman sites outside of London, despite their considerable food value and despite Roman fishing methods being capable of capturing them. Instead, freshwater, inshore, coastal and estuarine waters were preferred fishing grounds. The pattern across the British Isles is one of local consumption of freshly caught fish, including species like salmon that would not be immediately recognisable to Romans used to Mediterranean species. Within the Roman Mediterranean, species had known status connotations and relative values, often with sea fish being in greater demand and incurring greater costs than freshwater fish (Déry 1998, 94–95). In Roman Britain, these distinctions were less overt, although inland sites appear to consume sea fish that have been brought some distance from the shore, suggesting they are a desired foodstuff (Locker 2007). This may explain the paucity of carp family and perch identifications at Chester Amphitheatre too, though they have been found at other sites in Roman Britain. Alongside the consumption of freshly caught, local fish, Romans in Britain were also eating preserved imports from the Mediterranean region, and this is something seen at Chester and several other sites.

Spanish mackerel and the Roman fish trade

The proper name for the species referred to as ‘Spanish mackerel’ within zooarchaeological literature is *Scomber colias* Gmelin, 1789, or Atlantic chub mackerel. Many authors within archaeology refer to it by its previous name of *Scomber japonicus* Houttuyn, 1782, or chub mackerel, which is now used to describe the Indo-Pacific mackerel (Froese and Pauly 2016; see Van Neer *et al* 2010, 162). This report continues to use the term Spanish mackerel for consistency in the literature.

A total of 13 Spanish mackerel bones were found at the site in Phases 4 and 6, as well as some residual ones in medieval layers. Others that couldn’t be definitively distinguished from Atlantic mackerel may well be Spanish mackerel as well. Sizes were difficult to determine, but those that could be sized indicated at least 1 fish was 500–800 mm total length and two were 300–500 mm total length. Spanish mackerel is found around the Mediterranean Sea, along the coasts of modern Spain and Portugal, and along the northern and western coast of Africa. Its range can stretch to the southern waters of Bay of Biscay, but its presence in British waters is unknown (Froese and Pauly

Table 135 Fish species: scientific and common names.

Order or larger taxonomic grouping	Family	Scientific name	Common name
Rajiformes	Rajidae	Rajidae	Ray Family
Anguilliformes	Anguillidae	<i>Anguilla anguilla</i>	Eel
Clupeiformes	Clupeidae	<i>Alosa alosa/Alosa fallax</i> <i>Clupea harengus</i> Clupeidae	Allis Shad/ Twaite Shad Atlantic Herring Herring Family
Cypriniformes	Cyprinidae	Cyprinidae	Carp Family
Salmoniformes	Osmeridae	<i>Osmerus eperlanus</i>	Smelt
	Salmonidae	Coregonidae Salmonidae	Whitefish Salmon & Trout Family
Gadiformes	Gadidae	<i>Merlangius merlangus</i>	Whiting Cod Family
Scorpaeniformes	Cottidae	Cottidae	Sea Scorpion Family
Perciformes	Percichthyidae	<i>Dicentrarchus labrax</i>	European Seabass
	Percidae	<i>Perca fluviatilis</i> <i>Perca fluviatilis?</i>	Perch Perch? Perch Family
	Mugilidae	Mugilidae	Grey Mullet Family
	Scombridae	<i>Scomber colias</i> <i>Scomber scombrus</i> Scombridae	Spanish Mackerel Atlantic Mackerel Mackerel Family
			Perciformes Order
Pleuronectiformes	Bothidae (Scophthalmidae)	Bothidae	Turbot Family
	Pleuronectidae	<i>Hippoglossoides platessoides</i> <i>Hippoglossus hippoglossus</i> <i>Pleuronectes flesus</i> <i>Pleuronectes flesus/Pleuronectes platessa</i> <i>Pleuronectes flesus?</i> <i>Pleuronectes platessa</i>	Long Rough Dab Halibut Flounder Flounder/ Plaice Flounder? Plaice Halibut Family
Heterosomata (Pleuronectiformes)			Flatfish Order

2016). It is commonly found in very low quantities in many Roman sites with good bone preservation, and it has been found before in Chester, at 25 Bridge Street (Jaques *et al* 2004) and from other Roman sites in Britain, including Winchester Palace and Great Holts Farm (Locker 2007, Murphy *et al* 2000). This imported product was known as *salsamenta*, one of a number of imported fish products that provided a flavour of the Mediterranean. Others included *garum*, *hallex*, *liquamen* and *muria*, all of which were types of fish sauce based on fermenting and dissolving small oily fish from the Clupeiformes order, including sardines and anchovies (Van Neer *et al* 2010, 152). These preserved sauces were a crucial ingredient in Roman cuisine throughout the empire, adding a salty flavour to dishes (Cool 2006, 58–59). *Salsamenta*, in contrast, was a

salted preserved foodstuff, primarily produced from tuna, mackerel and shad, where the flesh – and any associated bones – was preserved in amphorae. Both the fish sauces and *salsamenta* are known from labelled amphorae, from written evidence (including a mention of *muria* on a wooden tablet from Vindolanda) and from direct evidence of production and consumption of the resulting products (Van Neer *et al* 2010). Spanish mackerel is the most readily recognised export around the outer reaches of the empire, principally because it can be easily recognised as a non-local species (Marzano 2013, Chapter 3; Van Neer *et al* 2010, 170). *Salsamenta* made of Spanish mackerel has been found in small quantities in Switzerland, Germany, Austria, the Netherlands, Belgium, Luxembourg, Spain and France, and there doesn't appear to be any high status

correlations with its identification (Locker 2007, 155; Van Neer *et al* 2010, 167). The Chester material includes 2 cranial bones, as well as a single abdominal vertebrae and 10 caudal, or 'tail' vertebrae (Table 134), thus suggesting that although tails were most common, the rest of the fish could be imported as well. Most Spanish mackerel finds from elsewhere tend to be vertebrae (Van Neer *et al* 2010, 167).

An amphora dating to the 1st century AD was found in Winchester Palace, Southwark, and it was marked as originating in Antibes. Six Spanish mackerel heads were found inside (Locker 2007, 153), and along with the Chester Amphitheatre material, these indicate that entire fish were preserved and imported, rather than just the tails. Four putative identifications of Spanish mackerel abdominal vertebrae were made from the early phase from 25 Bridge Street, Chester (Jaques *et al* 2004, table 11). Other locations producing Spanish mackerel include a late 3rd-century well at Great Holts Farm, Boreham, Essex (Murphy *et al* 2000), two putative identifications from 1st–3rd century AD deposits from Gorhambury villa, near St Albans (Locker 1990) and two identifications from the late Iron Age/Roman oppidum at Skeleton Green, Stevenage which suggests consumption of this imported foodstuff just prior to the Roman conquest (Wheeler 1981; Van Neer *et al* 2010, 170). Taken together, these sites show that small quantities of imported Spanish mackerel were being consumed in Roman Britain in the 1–3rd centuries AD, alongside considerable quantities of locally sourced, freshly caught fish. At the amphitheatre site, the closely resolved phasing allows us to narrow down the date range: Spanish mackerel only appear in phases dated between *c* AD 71–100. None was recovered from the 2nd or 3rd-century phases. This evidence from Chester conforms to the larger pattern found in the Roman empire: the majority of these bones were imported in the earlier centuries of the Roman occupation, but some are known from the 2nd and 3rd century (Van Neer *et al* 2010, table 1).

Fish sauces were referred to variously in the Roman era as *garum*, *muria*, *liquamen*, and *allec*, and they may be associated with differing levels of quality and different types of product. Exports from the Mediterranean region are primarily recognised by labelled amphorae, because the sauce itself is made from fully dissolved small fish and it leaves little archaeological trace (Van Neer *et al* 2010, 167). However, recent excavations have started to produce evidence of late Roman production of fish sauces within Britain and other parts of the empire. These deposits have included remains of thousands of juvenile herring, sprat, as well as any other small fish that could be caught in quantity including some, like flatfish, that would not have been used to make this product in the Mediterranean (Van Neer *et al* 2010, 175–177). One such example is the assemblage from London Gateway, a Roman salt making site in the Thames estuary. A unique deposit of fish bones was noted in a Late Roman ditch and this was sieved to

0.5 mm. A single 10 litre sample produced over 2.5 litres of tiny fish bones and scales from at least 9,500 tiny herring family fish. These were primarily 'whitebait': herring and sprats of 30–50 mm total length, along with assorted other juvenile species. This unique deposit, viewed in conjunction with the local salt production, is probably the result of filtering out the bones from fish sauce consumption (Nicholson 2012). Other examples suggesting similar local production include the mid-3rd-century Peninsular House, London, which produced a similar deposit of thousands of small, juvenile *Clupeiformes* (Locker 2007, 151; Bateman and Locker 1982), and 2nd and 4th century contexts from Dorchester Former County Hospital similarly producing the remains of over a thousand small, juvenile herring and sprat (Hamilton-Dyer 2008). York St Mary Bishopshill Junior has also produced very similar deposits of small herring and sprat, though this deposit is only broadly dated to late Roman–10th century and has not been analysed in any detail (Jones 1988). Similar but smaller deposits containing high densities of juvenile oily fish were also noted from 2nd to 4th-century contexts at Beddington, Lincoln and Chischester (Van Neer *et al* 2010, table 3). This industry may have developed around the North Sea to fulfil local demand for fish sauces, either alongside the higher quality imports from the Mediterranean, or in response to a decline in production. The latter is suggested by decreasing quantities of imported amphorae towards the end of the 1st century, with this trade coming to an end in the 2nd century AD (Van Neer *et al* 2010, 177). The fish remains from Chester were carefully examined for any evidence of fish sauce production, but although some fish were noted from the <2 mm sieve fraction, the species recovered were not the small, oily fish used to make fish sauces.

Conclusions

The fish assemblage from Chester Amphitheatre spans six phases and two areas, and almost all of it was derived from comprehensive sieving. The assemblage is the single largest collection of fish remains that represent food waste from Roman Britain, if one discounts a few unique deposits of fish sauce production residues. Most of the fish from Chester Amphitheatre indicate local fishing in the Dee, the Dee Estuary, and some inshore and shallow water fishing in Liverpool Bay. However, the deeper waters of Liverpool Bay and the Irish Sea were not fished, despite the richness of large marine species that would have been present. Fishing methods were probably varied, given the different types of taxa caught, and could well have included hook and line, net fishing, shore and boat fishing, and use of fish traps. Flatfish are the most common species exploited from the 1st to the end of the 2nd centuries, representing about 70 % of all identified bones. Although these are difficult to identify to species, both flounder and plaice were common, along with occasional finds of halibut and long rough dab. Eel was

the second most common taxonomic grouping, following by a variety of fish each representing less than 5 % of the identifications. These included salmon and trout family fish, Atlantic herring, Atlantic mackerel, shads, smelt, Spanish mackerel, European seabass, carp family, cod family, and various others, for a total of 27 different taxa. The final phase, associated with the use of the 2nd amphitheatre in the 3rd century, is different. Quantities are small but it would appear that flatfishes are no longer exploited in this phase. Instead, eel and herring family fish dominate.

The fishing grounds may not have changed, but something caused this change, either a change in fishing methods or a change in tastes. It is highly unlikely that there would have been any environmental impact responsible for this change: human preference is a more likely driver. The locally caught fish were generally small, with most only between 15 and 30 cm total length and only a few larger specimens noted. These could have been cooked whole and served on the bone, with each fish only providing food for one or two people. There is no evidence of any processing, butchery or differential deposition of one part of the fish; instead, all elements are present in expected proportions. These fish would have been suited for cooking whole in frying pans, and serving up whole. These would have been a delicate meal not suited to a 'fast food' style consumption. Some of these bones may have been table waste from food served at temporary stalls in the amphitheatre, and some of it may have come from dumps used and reused in the construction and maintenance of the amphitheatre. A few tiny bones found in the <2 mm sieve fraction could indicate some gutting was taking place locally and these were deposited along with the table waste.

The pattern of fish consumption follows broadly across phases 4, 5, 6 and 7, with only moderate variation from the general trend. However Phase 9 is markedly different, with a much greater reliance on eel and herring, with very few flatfish being consumed. The fish in this 3rd-century phase were also smaller than earlier phases, although similar habitats were being exploited. Phase 6 deposits were excavated in both areas A and B, but little variation was noted between these areas; this would suggest that similar

activities, at similar times, produced the refuse dumped in each area.

Spanish mackerel was identified from Phases 4 (c AD 71) and 6 (c AD 100), with both vertebrae and cranial elements noted. These were imports of *salsamenta*, preserved, salted fish from the Mediterranean or the seas around North Africa, Spain or Portugal, and they were probably brought to Chester in amphorae, some of which have been found elsewhere with labels denoting contents and origin. Finds of Spanish mackerel are known from 25 Bridge Street and elsewhere in Roman Britain. No evidence was found for the production of fish sauces in Chester, although these deposits tend to only be found in specialised areas of Roman settlements; fish sauces may well have been consumed here, but leaving little evidence behind.

The amphitheatre assemblage is consistent with other examples from Chester and Roman Britain. Fish were an important part of the Roman diet, and one that marked Romans and those wanting to be Roman as different from the fish-avoiding diets of the Iron Age. Romans appeared ready to consume fish species that they would not have recognised from the Mediterranean region, like salmon and trout, but their avoidance of deeper, open water fishing means that few of the cod family species were targeted. It would take several more centuries before the reliance on cod and herring would come to typify British fish consumption. The Romans made full use of the River Dee, the Dee Estuary, and the innermost reaches of Liverpool Bay. They preferred small fish, like flounder and plaice, and they probably cooked and served these whole and on the bone as meals for one or two people. They supplemented local fish with small quantities of imported *salsamenta*, bringing in a flavour of the Mediterranean, and they probably used fish sauces to flavour their recipes. These were initially also imported from the Mediterranean, but in the final years of the empire local variations may have had to suffice. We see very little variation in space or time at Chester Amphitheatre, barring the 3rd-century Phase 9, which suggests a change in preferences perhaps linked to the later date of this phase.

PART 5

SUMMARY CONCLUSIONS AND THE AFTERLIFE OF THE AMPHITHEATRE

This section will roll up the main conclusions of the work contained within this volume, and will also summarise the afterlife of the amphitheatre which will be fully examined in Volume 2, to which this will also act as an introduction.

Prehistory

The prehistory of the site is described and discussed at length in Part 2. The phases of occupation from the Mesolithic to the later Iron Age are a very significant addition to the record of prehistoric occupation in the Cheshire area, and include the earliest evidence for settled occupation within the bounds of modern Chester.

The earliest archaeological feature on the site was a small pit which contained three diagnostic lithic fragments of Mesolithic date, as well as pieces of heat-shattered stone. This pit combines with the presence of flint cores which had been worked down and abandoned after they had been fully utilised, to suggest both occupation and the practice of flint working on the site. The site would have possessed many advantages to the Mesolithic population, enabling them to take advantage of the resources of the land, river, and river fringe, while the elevated position would afford basic security. The site would not have been permanently occupied, but visited on a seasonal basis. It is suggested above (p 43) that the Chester site is most likely to conform to the winter camp aspect of the annual round of activity, though it cannot be stated whether this was a fixed site on the annual cycle or an occasional stopping point.

Lithics from the Neolithic to the early Bronze Age demonstrate that, although there is no sign of habitation or evidence for the working of flint on the site, nonetheless the location continued to be visited.

The first evidence of habitation of the site, indeed the earliest evidence for permanent settlement in Chester as a whole, is from the Middle Iron Age. Features of this phase were cut into the fill of the pit interpreted as of Mesolithic date. There was structural evidence for two buildings. The first comprised an arc of a curvilinear gully, most probably

the construction trench of a round-house. Two segments of gully survived, flanking a break which is interpreted as an entrance. Slightly more than half of the round-house trench had been removed by the excavation of the Roman arena. The building would have measured 8.4 m in diameter, well within the range of similar buildings in the region (Table 8). The second structure, and the most significant survival from this phase was the four-post building which like many similar Iron Age buildings can be interpreted as a store for agricultural produce. The building had two structural phases, the second set slightly askew from the first. The post-holes of this structure produced carbonised plant material, which yielded radiocarbon dates within the broad range 400–200 Cal BC. The analysis of the archaeobotanical samples showed that the building had been used for the storage of the by-products of cereal processing. Furthermore, the difference between the contents of post-holes in opposite corners of the building suggests that these materials had been stored in containers, possibly sacks, and that the internal space was organised. Two types of material were being stored; weed seed-rich material and chaff-rich material. The former may have resulted from the removal of weedy vegetation from harvested cereals, or from uprooted grassy vegetation perhaps growing on the fringes of arable fields and stored for use as fodder. Chaff appears to have been a valued commodity used for animal feed, bedding, fuel, packing or as temper within daub building material. Evidence for the exclusive storage of processing by-products is very unusual, but this find demonstrates that these materials had economic value at the time.

Following the abandonment of the buildings, agricultural activity seems to have continued up to the time of the advent of the Roman army in the area. The first evidence of this was the presence of a multitude of criss-cross striations on the natural subsoil, beneath a layer of buried cultivation soil. These striations were the result of ploughing with an ard plough. There was a stratigraphic relationship with the Middle Iron Age structures in that

a stake-hole of the settlement phase was cut by one of the ard-marks.

A later phase of agriculture was attested in a truly remarkable survival – that of the earthworks of cord-rig cultivation directly beneath the seating bank deposit of the first amphitheatre. This is of the first importance, as it represents the first record of such earthworks south of the main area of survival in Northumberland (p 67). Traces of burning before cultivation may mark the return to cultivation of previously farmed land (possibly after the ard-cultivated soils had lain fallow), and the earthworks may also reflect the introduction of a more sophisticated form of ard, capable of turning the sod. Pollen analysis elsewhere in Chester, at Frodsham Street and Water Tower Street has produced evidence of heathland and grassland, suggesting grazing land, and we can visualise pre-Roman Chester as a patchwork of cultivated areas with areas of pasture within a mixed farming economy. There is as yet no trace of the settlement(s) from which this Late Iron Age agriculture was practiced, and such settlements may lie well beyond the amphitheatre site.

Iron Age material culture is very poorly represented; however, the discovery of the iron spear head is unusual. More typical is the assemblage of VCP which is evidence that the site was one of many in the region which received the products of the Cheshire salt trade (p 66). It is significant to note that the bulk of the Mesolithic assemblage as well as the heat-shattered stone from the site were recovered from late Iron-Age cultivation soils demonstrating that the earlier occupation had already been ploughed-out before the Roman period. Similarly the VCP assemblage was almost wholly contained within the features and deposits of prehistoric Phases 1–2. The construction of the amphitheatre effectively sealed the Iron Age landscape and the prehistoric sequence, including the artefact assemblage, as extraordinarily small amounts of prehistoric material appeared residually in Roman deposits, except for the primary seating bank material which in part comprised redeposited prehistoric strata (Tables 2, 6, 7).

The survival of the cord-rig earthworks clearly suggests that the land was in use immediately before work on the amphitheatre commenced. Traces of prehistoric ploughing have been found in various locations in the city (p 69), and although it is not clear whether any or all of these were immediately pre-Roman in date, the implication at least of the amphitheatre evidence seems to be that an agricultural population was dispossessed by the Roman army in order to establish the military settlement.

The advent of Rome and the first amphitheatre

The earliest evidence for Roman presence on the amphitheatre site lies in the incorporation of Roman ceramics and coinage in the upper cultivation soils of the previous phase. This material was of consistent date, with

the samian ware favouring a Neronian-Flavian date (p 74), and a single coin dating to AD 71. The pre-amphitheatre activity attested on site is impossible to interpret beyond the fact there were a number of cut features, including a post alignment which respected neither the earlier cord-rig alignment nor that of the amphitheatre walls, and which therefore must represent an unrelated intermediate phase of activity. The remarkable palimpsest of animal and human footprints and wheel ruts seems to have been associated with this structure, and is very unusual and immediate evidence for the busy passage of Roman traffic of all sorts. The archaeological survival of such traces left in damp ground is only paralleled by the much more extensive palimpsest from Xanten (*Colonia Ulpia Traiana*), Germany where a cast of a land surface showing animal and human footprints, including the impressions of nailed shoes, and also wheel ruts, is preserved in the new museum. These traces were sealed beneath occupation layers which were in turn cut by the construction trench for the outer wall of the first amphitheatre. These layers also contained Flavian material, and the only coin was again dated to AD 71, like that from the top of the cultivation soil.

The early finds, and the two coins in particular, provide the *terminus post quem* for the building of Amphitheatre 1a. Shotter (p 219) has suggested that the numismatic evidence indicates that construction was early, possibly being initiated by the first garrison, Legion *II Adiutrix*. It is at any rate highly likely that the amphitheatre was built simultaneously with the fortress, and that it was part of the original scheme for the military establishment. It is probable that Amphitheatre 1a was not completed, though it seems likely that it was used to some degree.

Reverse analysis has demonstrated that the first amphitheatre was surveyed and laid out as an oval constructed from four circles. This was a simple survey method which is recorded in Roman survey manuals (p 148). In this method the arena would be laid out first, and then the line of the outer wall would be traced using circles of larger radius but drawn from the same centres. The outer wall would then be constructed, at least in part, and the arena excavated, casting the excavated spoil, comprising both prehistoric and natural deposits, up against the outer wall, and deploying this material in what would appear to have been a low bank. It is assumed that Amphitheatre 1a possessed major entrances into the arena on the northern and southern ends of the long axis, and part of the northern entrance may have been excavated, although so little remains it is not possible to be certain. It has been conclusively shown that the building had no entrances on the ends of the east-west short axis.

In its second phase, Amphitheatre 1b, the building received significant additions, and is correspondingly easier to understand. Firstly at least one external stairway was added to the exterior wall of the structure. This would allow spectators to ascend and then to pass over the wall into the auditorium. Comparisons of the angle of rise of

steps with similar Roman stairs allow the height of the outer wall to be suggested at something around 4.35 m (p 155). The major change however was within the *cavea*. Here the primary earthen seating bank was cut away to form a flat terrace, and was presumably stockpiled in the arena. Timber slots cut into this terrace housed a series of radiating prefabricated timber frames which supported timber seating (pp 96–118). The evidence for these frames survived in mineralised form. The survival of iron nails allowed an accurate reconstruction of the jointing (Fig 147) and also the species of timber used (p 118).

The *Nemeseum* is a problem in the story of the amphitheatre, as its structure is more complex than appreciated by Thompson, and it has been consolidated based on the idea that it was part of a single stone phase. Consideration of the evidence (pp 125–28) has led to the conclusion that the most likely context for the cell is as part of Amphitheatre 1b. The presence of short timber base-plates to the west of the cell is only part of the reason for this conclusion. On balance it seems likely that the room functioned from the beginning as a *Nemeseum*, and that the altar found within it was a primary feature, though subsequently moved around within the chamber.

The timber framework in Area A was sealed by freshly dug red sand and sandstone brash. Logic suggests that this came from the arena, which must have been deepened as part of the operation, and the *Nemeseum* would have been cut out of the earlier seating bank at the same time. In Area B the equivalent deposits comprised finds-rich refuse, presumably from various locations within the fortress and *canabae*, and it should be assumed that the 1a seating bank material, dumped in the arena, was used for the same purpose in another part of the *cavea*. The floor of the *Nemeseum* was at a similar level to the arena floor, again suggesting that it was contemporary both with the deepening of the arena and the construction of the arena wall in which was the entrance doorway to the *Nemeseum*.

The date of the alterations which created Amphitheatre 1b is (for this site) fairly certain. The *terminus post quem* for the changes resides in three Domitianic coins from the area around Amphitheatre 1a, all dating to AD 85, and a single coin of the same emperor, AD 92–4, from the packing above one of the radial timber frames (p 128). The dated samian ware gives a similar picture, and it is possible to agree with Thompson (1976, 148–9) that the date of these changes (for Thompson, the construction of the arena wall) was around AD 100. Shotter (p 220) has suggested that the Domitianic coinage deposited before the alterations which created Amphitheatre 1b, may coincide with the arrival *c* AD 86–87 (p 4) of Legion XX *Valeria Victrix*. It is certainly possible that a hiatus in building occurred at the time of the change of garrison, and that the Twentieth legion completed work begun by the Second. Indeed it is further possible that the material deposited in the seating bank in Area B Phase 6 was the result of clearance and

alteration in the fortress and *canabae* carried out by the newly arrived legion (p 211).

As far as we are aware, the stratigraphy between the outer walls of the two amphitheatres, which provides evidence for activities taking place immediately outside Amphitheatre 1 during its active life, is a unique survival in the Roman Empire. Nowhere else is there direct stratigraphic evidence for such activities. This evidence reflects on three aspects; the economy of amphitheatre maintenance, the behaviour of spectators and general activities within the broader settlement.

The important reflection on the amphitheatre economy relates to the supply of sand. The glaciofluvial soft yellow sand dumped around the outside of the amphitheatre is in stark contrast to the natural sand of the site. It must therefore have been imported to the site, and the most likely sources are the surface exposures of such sand towards Upton, Hoole and Waverton (Fig 2). The stratigraphic evidence from Area A shows that sand was dumped and then moved many times (p 132, Figs 116, 117). The sand must have been imported to floor the arena. It is impossible to deduce whether we are dealing with sand removed from the arena and awaiting removal and disposal, or sand stockpiled for use in the arena, but a mixture of both explanations seems the most logical. The quantity of sand required to floor the arena to the depth of the threshold of the *Nemeseum* (equal to the depth of the tethering stone recovered in the arena phase of Amphitheatre 2) is estimated at 557.5 m³ (p 160). It seems at least possible that the arena was regularly resurfaced, with total replacement of the sand taking place occasionally, but still the quantities required would lead to the development of a local sand quarrying industry, probably under military control. It is at least interesting in this context that the concentration of small Roman camps to the east of Chester lie in areas of surface exposures of sand (Fig 2; Philpott 1998).

The second Roman amphitheatre

The second, larger building is fully described in Part 3.2. Analysis of the plan suggests that, in order to establish the course of the new outer wall, circles were drawn from the same centres as for the original layout. This may imply that plans and records of the original survey were kept in an archive, as deduced by Mason (2000a, 123) for the final construction of the Elliptical Building. It is entirely probable that both the second amphitheatre and the Elliptical Building in its final form were built at the same time during the apparent early 3rd century recommissioning of the fortress following the absence of the legion in the north (pp 6–7) (similarities in the plans of the amphitheatre and the Elliptical Building (which is actually planned as an oval) might even suggest that the original Flavian plans of both structures were by the hand of the same engineer; pers comm Julian Baum). The absence of any extensive archaeological dating from the amphitheatre excavation

means that for the moment it is necessary to suggest this date based upon analogy with events across the broader site.

The survival of the two steps in Entrance 2 (p 179) has allowed calculations to be made of the size and volume of the building, and the creation of a convincing reconstruction (pp 195–208). The building was a great advance on its rather more humble predecessor. It certainly had major entrances at each end of the long axis (north and south) and on the east end of the short axis, though the proximity of the building to the Souters Lane ravine would have precluded the placing of a principal entrance on the western side. This ravine would have been a topographical limiting factor to the potential size of the second amphitheatre. *Vomitoria* were positioned, two between each pair of principal entrances, with the site of the supposed western principal entrance occupied instead by a standard *vomitrium*. Within these *vomitoria*, steps led up to the *praecintio* from which seating could be accessed. The steps opened immediately from the street. It is clear that the most elaborate entrance was the eastern, comprising a ramp leading into the arena flanked by two side passages which led directly to the *cavea* and the seats of the more important spectators. Although no evidence survived, this entrance may have been elaborated. The three arches are reminiscent of a Roman triumphal arch, and this faced in the direction from which travellers by road would approach *Deva* (p 204). The building was rather severe in appearance, with the outer wall ornamented with simple pilaster strips at regular intervals around the circuit.

Chester has the largest amphitheatre in Roman Britain, although the sizes of the three amphitheatres built early in the life of the province by the legions and the peregrine population of London are similar (assessed on arena length: Chester 58.34 m, Caerleon 56 m, and London 52.3 m). In terms of amphitheatres within the Roman Empire, however, Chester is rather average. David Bomgardner's (1993, 389) cluster analysis of amphitheatres, places Chester firmly in the centre, within a broader cluster which includes many other legionary amphitheatres including many sites noted as *comparanda* in various areas of discussion above, at Caerleon, Carnuntum, Aquincum, Xanten and Vindonissa.

The survival of arena furniture is an important discovery (p 194), though quite how the axial line of tethering blocks worked in practice is difficult to understand. No ancient representation of the arena shows such facilities, except the Bignor mosaic, and this does not show the blocks in use.

The date at which the amphitheatre went out of use is rather simpler to determine archaeologically than the date of construction. The dark soil within the arena which was reported by both Thompson and Newstead contained a group of coinage and pottery which was late 3rd century in date. No later material was found. The *terminus post quem* for the redundancy of the building may be found in the coinage recovered from these deposits, and is *c* AD 274. The laying of stone surfaces in the arena, we would argue, belongs to a later development *contra* Thompson

(1976, 189), who thought that the laying of these surfaces came immediately after the deposition of the coins.

Change of use and robbing (Phases 10–11)

Volume 2 of this report will begin with the change of use of the amphitheatre in Phase 10. There is plentiful archaeological evidence for this. Firstly at least one of the *vomitoria* (Entrance 11) was deliberately walled up. When functioning, the amphitheatre needed to get the maximum number of people into the building in the minimum amount of time. Blocking entrances is a real benchmark for a change of use.

Most of the evidence for this, however, derives from the arena and the principal east entrance. In the arena Thompson recorded the patchy stone surfaces mentioned above, and an obvious pathway leading to the centre of the arena from the main north gate (Entrance 12). This stone-kerbed path lay stratigraphically above the axial drain in the arena. In the centre of the arena Thompson found a pattern of post-holes which he interpreted as a saluting platform (Thompson 1976, 154), while Matthews suggested other interpretations – possibly as evidence for the apparatus of execution in the arena, or as the foundation post-holes for multi-phase timber buildings (Matthews 2004, 18). The latter conclusion was confirmed in Area C, where similar features were found in the centre of the arena, that were clearly a continuation of the features recorded by Thompson. No fewer than seven sub-phases of pits, post-holes and surfaces were defined in Area C (all within a trench 5 m square). One of the post-holes of the fourth sub-phase produced two carbonised grains which produced identical radiocarbon dates of cal AD 770–890 (at 68% confidence). This is highly suggestive, being the only mid-Saxon date to have come from Chester. Ward, S (1994, 116) suggests a four-phase framework for the period between the Roman occupation and the Norman conquest:

- 1 Sub-Roman/ British, 5th – 7th century, when Chester was part of the kingdom of Powys.
- 2 First period of Mercian rule, late 7th century to the Scandinavian incursions of the end of the 9th century.
- 3 The most prosperous period from the foundation of the burh in 907 to the Viking raid of 980.
- 4 From the raid of 980, a less prosperous period through the wars of Æthelred's reign, the loss of lands to Wales in the 11th century, culminating in the Norman conquest and the Harrying of the North.

The radiocarbon date from the arena post-hole is squarely in the second period – a time for which the archaeological evidence from the fortress itself is 'restricted to soil generation, which is interpreted as being the result of agricultural activity' (Ward, S 1994, 118). The discovery of

what appears to be intensive mid-Saxon occupation outside the Roman fortress parallels the situation in other Roman settlements where the Roman walled areas were shunned until they were reused as the defences of late-Saxon *burhs*. The best known example of this phenomenon is, of course London, where *Lundenwic* was located to the west of the Roman walled city within which, as at Chester, the generation of the so-called ‘dark earth’ followed Roman occupation (Cowie *et al* 2012, 101). Ward, S (1994, 119) invokes this evidence and states that ‘if one were to seek a centre for a Mercian settlement outside the Roman fortress, then an obvious one lies in the vicinity of St John’s church south-east of the fortress on a rock bluff overlooking the River Dee’; in short, the site of the amphitheatre. In Volume 2 it will be argued that this is indeed the location of mid-Saxon Chester. It is interesting that in the Anglo-Saxon Chronicle entry for the year 894 reference is made to Chester as a ‘deserted Roman site’, while also mentioning that ‘the levies were unable to overtake them [the Danes] before they got inside that fort, but they besieged it some two days’ (Garmonsway 1960, 88). Strickland (1994, 5) sees this as demonstrating that the fortress defences were still viable, but it is at least possible that the fort referred to was, in fact, the occupied and defensible amphitheatre.

The traditional date, from a late source, for the foundation of the church of St John is 689, by Æthelred, king of Mercia (674–704) (Barrow *et al* 2005). A variety of historical and archaeological evidence shows that St. John’s was an important church in later Anglo-Saxon Chester. Although in the later period its site outside the walls of the *burh* is surprising, as a mid-Saxon foundation the site alongside a contemporary settlement in the amphitheatre makes sense. The principal east gate of the amphitheatre was structurally altered in the post-Roman period, with the central ramp cut away to accommodate the new walls of a stone-built structure, featuring a stair leading to the southern side passage. Although excavated by Thompson, who interpreted the structure as a Roman feature contemporary with the building of his ‘stone amphitheatre’, Keith Matthews has suggested that this structure is early medieval, and even that it may have been the original St John’s church (Matthews 2004, 22–23). Further examination of the evidence, strengthens this argument, as does the existence of mid-Saxon occupation. If this is a church built in the ruins of the amphitheatre, it finds parallels in Tarragona and other sites in Spain (Blasco 2014), and at Durres, Albania (Bowes and Mitchell 2009). These arguments will be expanded and explored fully citing all relevant evidence in Volume 2.

The reuse of the amphitheatre was ended by the robbing of the stone from its walls (Phases 11a and 11b). It is possible that the section of the city walls from the south-east angle tower of the legionary fortress to the river was a part of the work of Æthelflaed in founding the *burh* in 907 (Mason 2007, 9). As a context for the desertion of the mid-Saxon amphitheatre settlement this would make sense,

as the area of the legionary fortress seems to have been effectively re-occupied, and the population centre would have shifted. This would also make sense of the use of stone from the amphitheatre to build the wall. If this is the case, other evidence suggests that the church remained.

In 1075 the status of St John’s was raised to that of a cathedral, when Bishop Peter of Lichfield moved his see to Chester (by 1102 the see had been moved again, to Coventry, by Peter’s successor, Bishop Robert de Limesey; Barrow *et al* 2005). The extant Romanesque St John’s was begun *c* 1100. Work was interrupted and begun again *c* 1125–50. By 1200 construction reached roof level as far as the east end of the nave, and the clerestories, aisle windows and porch date to the early 13th century (Gem 2000). Within Area B, the total robbing of the outer walls of the amphitheatre is archaeologically dated to the same period, from the mid-11th to the 13th century. This appears to be the context for the total robbing of the amphitheatre outer walls; the stone was reused for the building of the new church and monastery. The dating of finds from the arena fill strongly indicates that the amphitheatre had completely disappeared from sight by the late 14th century.

The use of the site in the Middle Ages (Phases 12–13)

It is probable that the Speed map of 1610 (Fig 8) reflects the situation on the north side of the amphitheatre site, including Area A throughout the medieval period. It seems that the area of the *cavea* was built up, while the arena was not. The use of the arena for gardens and open spaces seems to have been constant from the Middle Ages to the eighteenth century, and is logical, as the *cavea* would have comprised solid ground while the arena fill was soft, and unsuitable for building. Certainly in Area A the archaeological evidence consists principally of rubbish and cess pits relating to buildings which would have fronted onto the forerunner of Little St John Street (Fig 7). The finds and ecofactual material from these pits, which will be fully discussed in Volume 2 show that these buildings were probably domestic houses. In Area B there were more, and more heavily disturbed, medieval stone walls and it is probable that these related to St John’s, possibly as monastic structures. It is probable that the whole area of St John’s and the former amphitheatre site comprised part of the extramural manor of ‘Redcliff’ and/or the ‘Bishop’s Borough’, both of which were held by the Bishop of Lichfield in 1086. St John’s continued as an important ecclesiastical establishment throughout the period up to the dissolution in 1548, not least because of its possession of an important relic, the Rood of Chester (Laughton 2008, 74). The discovery of artefacts reflecting literacy in both Areas A and B further suggest that the site of the former amphitheatre remained an ecclesiastical holding.

The Dissolution and the English Civil War (Phases 14–15)

After the Dissolution St John's survived as a parish church. At the time of dissolution the precinct contained many other buildings, including many clergy houses, and these seem to have survived and to have been put to use, with the names of some of those who took over ecclesiastical buildings being known (Barrow *et al* 2005). Excavated evidence for the post-Dissolution period shows the accumulation of garden soils in the former arena, and the excavation there of at least one rubbish pit containing very high status objects of Tudor date, indicating that those acquiring former monastic property were of some wealth.

During the English Civil War Royalist Chester was besieged by a Parliamentary army. During September of 1645, the besiegers established a small gun and snipers in the tower of the church, and throughout the siege they fired on the walls from this vantage point (Barratt 2003, 88). This continued throughout the siege, and in late January 1646 a new battery was being prepared on the tower (Barratt 2003, 158; the siege ended on 3rd February). On September 21st 1645 an artillery battery was established in St John's churchyard, and fire from here effected a breach in the walls which may still be seen in Roman Gardens. There is little doubt that many surviving buildings would have been destroyed in order to establish the field of fire. Archaeological testimony to this period was found in Area B in the shape of a large number of spent musket and pistol balls and fittings from a musketeer's bandolier.

17th and 18th centuries (Phases 16–18)

After the Civil War siege Chester saw a slow recovery and extensive rebuilding and many wealthy citizens began to build elegant mansions (Ward, S 2009, 73). During the Thompson excavations a date stone of 1664 was found beneath the later St John's House, suggesting that such activity took place early on the former amphitheatre site (Thompson 1976, pl lviid), though no structural evidence for this period was recovered during our excavations.

By the mid-18th century there was a desire among the more important and wealthy gentry to live outside the city walls where there was space to construct new mansions with elaborate gardens (Ainsworth and Wilmott 2004b, 17). By the mid-18th century some eight mansions with their gardens had been established in the area between the amphitheatre site, St John's and the Groves. Two of these mansions – St John's House and Dee House occupied opposite sides of the amphitheatre *cavea* with the former arena used for gardens. Several maps and prospects of the period attest to the genteel grandeur of the buildings and the geometrical elaboration of the gardens. The excavations have produced evidence for this period, particularly in the

form of such finds as imported Chinese porcelain, and the bedding trenches of the Dee House gardens. Although the greater structures are shown on maps, these do not tell the whole story, and a cellared cottage excavated in Area B was unknown before the excavation took place. Work in front of Dee House in 2015 revealed a further cellar, and it is clear that the history of building over the amphitheatre remains is not as yet fully understood. Following the demolition of St John's House to facilitate the excavation of the amphitheatre in 1958 (p 14) the surviving buildings which resulted from the vibrant new social and architectural expansion of this part of Chester are the old Bishop's Palace, St John's Vicarage and Dee House.

19th and 20th centuries (Phases 19–21)

The major changes to be seen during the last two centuries are the loss of the tower of St John's church, which collapsed in 1881, the demolition of five of the mansions and their gardens, the exposure of the northern half of the amphitheatre and the construction of Trident House. The last two parts of the story are dealt with in the introduction (pp 13–20).

Conclusions

This summary illustrates the fact that, far from being solely concerned with the Roman amphitheatre, the Amphitheatre Project illuminated every period of Chester's past. The earliest recorded occupation in the Mesolithic era and the earliest recorded settlement, in the Middle Iron Age were hitherto unknown, and preserved only by virtue of having been sealed by the construction of the amphitheatre. Most of this volume is, of course, concerned with the structure and Roman history of the amphitheatre, however, the excavation as a whole has shown how the existence of the amphitheatre, even after it had passed out of memory, was the most profound influence of the later development of this part of Chester. The building appears to have been the centre of Middle Saxon Chester, a period again which is illuminated virtually for the first time by this work. The influence of this settlement on the siting of St John's church seems certain. St John's itself then became the chief influence on the area as cathedral and monastery until the Dissolution. The clearance of the monastic buildings, culminating in the destruction wrought in the Civil War allowed this virtual cathedral close to become the focus for wealthy development, the foundation of mansions and gardens and the basis of the much-loved open area between the amphitheatre and the river Dee. It is these developments, drawing on the historical, archaeological and graphical evidence that will be fully described and discussed in Volume 2.

APPENDIX 1

Quantification of archaeobotanical remains from Iron Age deposits

Table 1.1 Archaeobotanical remains from the Iron Age round house and cord-rig deposits

	Sample	4827	4836	4805
	Context	1341	1353	1201
	Feature	1340	1352	-
	Feature type	pit	gully	Cord-rig
	Vol (l) of sample	60	95	60
	Phase	1A	1A	1B
	Structure	Round house		-
Cereal Grain				
<i>Triticum</i> sp.	Wheat, rounded grain	-	2	-
<i>Triticum</i> sp.	Wheat grain	2	-	-
<i>Hordeum vulgare</i> L.	Barley grain	1	-	-
Cerealia indet	Indeterminate grain	-	1	3
Chaff				
<i>Triticum spelta</i> L.	Spelt wheat, glume base	1	-	-
<i>Triticum</i> cf <i>dicocum</i> Schübl.	cf Emmer wheat glume base	-	-	1
<i>Triticum dicocum/spelta</i>	Emmer/Spelt wheat glume base	1	9	2
<i>Triticum dicocum/spelta</i>	Emmer/Spelt wheat spikelet fork	1	2	-
Other Cultivated Plants				
cf. <i>Linum usitatissimum</i> L.	cf. Flax seed	1	-	-
Herbaceous seeds				
<i>Ranunculus acris/repens/bulbosus</i>	Buttercup	-	1	-
<i>Ranunculus</i> sp.	Buttercup, small seeded	-	-	2
cf. <i>Ranunculus</i> sp.	cf. Buttercup	2	-	-
<i>Urtica dioica</i> L.	Stinging nettle	-	-	2
<i>Chenopodium album</i> L.	Fat hen	5	9	-
<i>Atriplex</i> sp.	Oraches	1	1	-
Chenopodiaceae	Goosefoots, indeterminate	1	-	-
Caryophyllaceae	Pinks, indeterminate	-	1	-
<i>Spergula arvensis</i> L.	Corn spurrey	-	-	4
<i>Persicaria lapathifolia</i> (L.) Gray	Pale persicaria	-	1	4
<i>Persicaria lapathifolia/maculosa</i>	Pale persicaria/Redshank	-	1	39
<i>Polygonum aviculare</i> L.	Knotgrass	-	3	-
cf <i>Polygonum aviculare</i> L.	cf. Knotgrass	-	-	1
Polygonaceae indet.	Knotweeds	1	1	2
<i>Rumex acetosella</i> L.	Sheep's sorrel	1	4	35
<i>Rumex</i> sp.	Docks	-	-	2
cf <i>Malva</i> sp.	cf. Mallow	-	-	3
cf. <i>Viola</i> Section <i>Melanium</i>	cf. Pansy	-	-	1

	Sample	4827	4836	4805
	Context	1341	1353	1201
<i>Aphanes arvensis</i> L.	Parsley-piert	-	-	1
<i>Vicia/Lathyrus</i> sp.	Vetch/Vetchling/Tare, small seeded	4	-	2
<i>Lotus/Trifolium</i> type	Trefoil/Clover	8	8	292
cf. <i>Epilobium</i> sp.	cf. Willow herb	-	-	1
cf. <i>Prunella vulgaris</i> L.	cf. Selfheal	-	-	3
<i>Plantago lanceolata/media</i>	Ribwort/Hoary plantain	-	1	25
<i>Galium aparine</i> L.	Cleavers	-	1	-
cf. <i>Galium</i> sp.	cf. Cleavers	-	1	-
<i>Carex</i> sp.	Sedge, 3 sided	2	1	-
<i>Lolium/Festuca</i> type	Rye-grass/Fescue	1	-	-
<i>Avena</i> sp.	Oats	-	-	1
<i>Poa annua</i> / <i>Phleum</i> sp. type	Annual meadow grass/Cat's tail	-	5	14
<i>Bromus</i> sp.	Brome grass	-	1	-
Poaceae	Small seeded grasses	3	-	12
Poaceae	Intermediate seeded grasses	-	2	-
Poaceae	Large seeded grasses	-	-	-
Indet		8	10	97
Shrubs and trees (seeds)				
<i>Rubus</i> sect. <i>Glandulosus</i> Wimm. & Grab	Blackberry/Bramble	-	-	1
<i>Corylus avellana</i> L.	Hazel nut shell fragment	1	-	-
<i>Crataegus monogyna</i> Jacq.	Hawthorn, stone	-	1	-
Other plant parts				
Poaceae type	Grass, small culm node	-	4	-
Poaceae type	Small grass, basal culm/rhizome	1	-	+++
Non-plant remains				
Insect pupa		1	-	-
<i>Cenococcum geophilum</i> Fr	Fungal spores	-	+++	-
Tarry charred mass incorporating culm segments & leaf impression		1	1	-
Summary data				
	Total Grain	3	3	3
	Total Chaff	4	13	3
	Total Weed seeds	38	52	543
	Total 'other plant items'	2	5	1
	Total <i>Triticum</i> grain	2	2	0
	Total <i>Triticum</i> glumes	4	13	3
	Number of <i>Triticum</i> glume bases to grain (glumes/grain)	2	6.5	-

+ = present; ++ = common; +++ = abundant

Table 1.2 Archaeobotanical remains from four-post structure Building 2 phases 1Ai and ii

	Sample	4743	4731	4807	4844	4845	4815	4833	4839	4838	4840
	Context	1115	1093	1306	1359	1360	1313	1337	1355	1356	1357
	Feature	1092	1092	1305	1361	1361	1339	1354	1354	1354	1354
	Vol (l) of sample	28	40	40? 90?	105	6	260	85	24	53	53
	Building	2/i	2/i	2/i	2/i	2/i	2/ii	2/ii	2/ii	2/ii	2/ii
	Fraction sorted	100	100	100	100	100	50	100	100	100	100
Cereal Grain											
<i>Triticum spelta</i> L.	Spelt wheat grain	-	-	-	-	-	-	-	1	-	-
<i>Triticum dicoccum</i> Schübl.	Emmer wheat grain	-	-	-	-	1	-	-	-	-	-
<i>Triticum</i> cf. <i>dicoccum</i> Schübl.	cf. Emmer wheat grain	-	-	-	-	-	-	2	-	-	-
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt wheat grain	-	-	-	-	-	-	-	1	-	1
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt wheat, short grain	-	-	-	-	-	-	-	-	1	-
<i>Triticum</i> sp.	Wheat grain	-	1	1	3	1	1	7	3	1	-
<i>Hordeum vulgare</i> L.	Barley, hulled grain	-	-	1	1	-	-	-	-	-	-
<i>Hordeum vulgare</i> L.	Barley grain	-	1	-	2	1	-	4	-	-	-
Cerealia indet	Indeterminate grain	1	3	2	14	6	1	13	-	2	-
Chaff											
<i>Triticum spelta</i> L.	Spelt wheat, glume base	-	3	11	131	127	6	86	90	21	-
<i>Triticum spelta</i> L.	Spelt wheat, spikelet fork	-	-	-	4	2	-	1	1	2	-
<i>Triticum</i> cf. <i>spelta</i> L.	cf Spelt wheat glume base	-	-	-	-	7	-	-	-	-	-
<i>Triticum dicoccum</i> Schübl.	Emmer wheat, glume base	-	-	-	4	2	-	1	2	-	-
<i>Triticum dicoccum</i> Schübl.	Emmer wheat, spikelet fork	-	-	1	4	3	-	1	2	-	-
<i>Triticum dicoccum</i> Schübl.	Emmer wheat spikelet fork/rachis internode	-	-	-	-	1	-	-	-	-	-
<i>Triticum</i> cf. <i>dicoccum</i> Schübl.	cf. Emmer wheat glume base	-	1	-	-	-	-	-	1	-	-
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt wheat glume base	7	3	8	596	179	5	191	218	95	48
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt wheat spikelet fork	-	-	3	12	24	-	45	27	16	7
<i>Triticum</i> sp.	Wheat, hexaploid spikelet base/rachis	-	-	-	1	-	-	-	-	-	-
<i>Triticum</i> sp.	Wheat, hexaploid rachis internode	-	-	1	1	-	1	2	-	-	-
<i>Triticum</i> sp.	Wheat, hexaploid basal rachis	-	-	-	-	4	-	-	1	-	-
<i>Triticum</i> sp.	Wheat, indet rachis internode	-	-	-	-	-	-	4	6	1	-
<i>Triticum</i> sp.	Wheat, basal rachis/lower internode	-	-	-	2	-	-	-	-	-	-
<i>Triticum</i> sp.	Wheat, spikelet base/upper rachis internode	-	-	-	2	-	-	-	-	-	-
<i>Hordeum vulgare</i> L.	Barley, six row rachis node/internode	-	-	-	-	2	-	-	-	-	-
<i>Hordeum vulgare</i> L.	Barley, rachis node/internode	-	-	1	-	1	-	-	-	-	-
Other cultivars											
cf <i>Linum usitatissimum</i> L.	cf Flax	-	-	-	-	-	-	-	1	-	-
<i>Brassica nigra</i> (L.) W.D.J. Koch	Black mustard	44	17	-	-	-	-	1	-	-	-
<i>Brassica/Sinapis</i> sp.	Cabbage/Mustard	154	57	7	12	-	-	5	-	2	2
cf <i>Brassica/Sinapis</i> sp.	cf. Cabbage/Mustard	18	-	-	-	1	-	-	-	-	2

	Sample	4743	4731	4807	4844	4845	4815	4833	4839	4838	4840
	Context	1115	1093	1306	1359	1360	1313	1337	1355	1356	1357
Herbaceous seeds											
<i>Ranunculus acris/repens/ bulbosus</i> L.	Buttercup	2	-	1	-	-	-	-	-	-	-
cf <i>Ranunculus</i> sp.	cf. Buttercup	-	-	-	1	-	-	-	-	-	-
cf <i>Thalictrum</i> sp.	cf. Meadow-rue	-	-	1	-	-	-	-	-	-	-
<i>Chenopodium album</i> L.	Fat hen	71	-	17	24	6	26	6	6	6	1
<i>Chenopodium</i> cf <i>album</i> L.	Fat hen	-	9	-	-	-	-	-	-	-	-
<i>Chenopodium</i> sp.	Goosefoot/Fat hen	-	10	-	-	-	-	-	-	-	-
<i>Atriplex</i> sp.	Oraches	32	4	12	5	4	4	5	3	5	-
<i>Chenopodium/Atriplex</i> sp.	Goosefoot/Fat hen/Oraches	-	-	22	10	-	-	-	-	-	-
Chenopodiaceae		52	4	2	-	-	12	3	4	3	1
<i>Montia fontana</i> subsp. <i>chondrosperma</i> (Fenzl) Walters	Blinks	-	-	-	-	-	-	1	-	-	-
<i>Stellaria media</i> gp.	Common chickweed	2	4	9	7	6	18	-	-	10	-
cf. <i>Stellaria media</i> gp.	cf. Common chickweed	-	-	-	-	-	-	-	2	-	-
cf. <i>Cerastium</i> sp.	cf. Mouse ears	-	-	-	-	-	1	-	-	-	-
Caryophyllaceae	Pinks, indeterminate	2	3	-	3	-	-	5	-	-	-
Caryophyllaceae/Chenopodiaceae	Pinks/Goosefoot	-	-	-	-	-	3	-	-	-	-
<i>Spergula arvensis</i> L.	Corn spurrey	5	-	-	9	2	-	1	-	1	1
<i>Persicaria lapathifolia</i> (L.) Gray	Pale persicaria	87	7	16	71	14	43	15	5	6	8
<i>Persicaria maculosa</i> Gray	Redshank	16	-	-	-	-	-	-	-	2	-
<i>Persicaria lapathifolia/maculosa</i>	Pale persicaria/Redshank	3	-	11	3	16	18	3	-	4	-
<i>Persicaria</i> cf. <i>mitis</i> (Schrank) Opiz ex Assenov	Tasteless Water-pepper	-	-	1	-	-	-	-	-	-	-
<i>Persicaria hydropiper</i> (L.) Spach	Water-pepper	-	1	-	-	-	-	-	-	-	-
<i>Persicaria</i> sp.	Knotweed	-	37	3	-	-	-	-	-	-	-
<i>Polygonum aviculare</i> L.	Knotgrass	14	-	1	3	1	5	-	1	1	-
cf. <i>Polygonum aviculare</i> L.	cf. Knotgrass	1	-	-	-	-	1	-	-	-	-
<i>Fallopia convolvulus</i> (L.) Á. Löve	Black-bindweed	24	-	2	6	1	-	-	1	3	1
cf <i>Fallopia convolvulus</i> (L.) Á. Löve	cf. Black-bindweed	4	-	-	1	-	-	2	-	-	-
Polygonaceae indet.	Knotweed family	6	2	5	-	1	4	-	-	-	-
Polygonaceae/Cyperaceae	Knotweed/Sedge family, internal cotyledon	-	-	4	6	1	-	-	-	-	-
<i>Rumex acetosella</i> L.	Sheep's sorrel	5	2	2	4	-	3	2	-	-	-
<i>Rumex</i> sp.	Docks	1	3	1	-	-	-	1	-	-	-
cf <i>Rumex</i> sp.	cf. Docks	4	-	2	-	-	6	-	-	-	-
Brassicaceae	Mustard family	1	-	-	-	-	-	-	-	-	1
<i>Aphanes arvensis</i> L.	Parsley-piert	-	-	-	-	-	-	-	-	1	-
<i>Vicia/Lathyrus</i> sp.	Vetch/Vetchling/Tare, medium seeded	-	-	-	-	-	-	-	2	-	1
<i>Vicia/Lathyrus</i> sp.	Vetch/Vetchling/Tare, small seeded	1	-	1	7	3	2	1	-	1	-

	Sample	4743	4731	4807	4844	4845	4815	4833	4839	4838	4840
	Context	1115	1093	1306	1359	1360	1313	1337	1355	1356	1357
<i>cf Vicia/Lathyrus</i> sp.	Vetch/Vetchling/Tare, small seeded	-	2	-	-	-	-	-	-	-	-
<i>Lotus/Trifolium</i> type	Trefoil/Clover	6	-	8	2	-	1	3	-	1	1
Fabaceae indet	Pea family	1	-	-	-	-	-	-	-	-	-
<i>Galeopsis</i> sp.	Hemp nettle	4	-	-	-	-	-	-	-	-	-
<i>cf. Galeopsis</i> sp.	<i>cf.</i> Hemp nettle	-	-	-	2	1	-	-	-	-	-
<i>Plantago major</i> L.	Greater plantain	-	-	-	-	-	3	-	-	-	-
<i>Plantago lanceolata/media</i>	Ribwort/Hoary plantain	-	1	2	-	-	-	1	-	-	1
<i>Galium aparine</i> L.	Cleavers	1	-	1	2	1	-	1	-	-	-
<i>Lapsana communis</i> L.	Nipplewort	-	1	-	-	-	-	-	-	-	-
Asteraceae	Daisy family, large seeded	-	-	-	-	-	-	-	-	-	1
<i>cf Asteraceae</i>	<i>cf.</i> Daisy family, in small seeded cluster	-	-	-	-	7	-	-	-	-	-
<i>cf. Cladium mariscus</i> (L) Pohl	<i>cf.</i> Great fen sedge	-	-	-	-	-	-	-	-	1	-
<i>Carex</i> sp.	Sedge, 2 sided nutlet	7	-	1	-	2	2	-	1	-	-
<i>Carex</i> sp.	Sedge, 3 sided nutlet	4	2	1	-	2	-	2	1	2	-
<i>cf. Carex</i> sp.	<i>cf.</i> Sedge, 3 sided nutlet	-	-	-	2	-	-	-	-	-	-
<i>cf Cyperaceae</i>	<i>cf.</i> Sedge family	-	-	-	-	-	-	-	-	2	1
<i>Lolium/Festuca</i> type	Rye-grass/Fescue	52	-	-	4	-	3	1	-	-	-
<i>Avena</i> sp.	Oats	-	-	1	3	1	-	1	-	-	1
<i>Poa annua</i> L./ <i>Phleum</i> sp. type	Annual meadow grass/Cat's tail	25	-	14	11	-	-	-	2	3	-
<i>Bromus</i> sp.	Brome grass	-	3	-	24	3	-	22	11	4	5
Poaceae	Small seeded grasses	-	31	4	4	5	125	-	4	1	3
Poaceae	Large grass, distal end	-	-	-	-	2	-	-	-	-	-
Poaceae	Intermediate seeded grasses	166	-	-	9	-	-	3	-	2	-
Poaceae	Large seeded	-	2	1	16	1	-	-	-	3	1
Indet		197	52	15	49	15	61	11	-	14	4

Shurbs and trees (seeds)

<i>Corylus avellana</i> L.	Hazel nut shell fragment	-	-	1	-	-	-	-	-	-	-
<i>Rubus</i> sect. <i>Glandulosus</i> Wimm. & Grab	Blackberry/Bramble	-	4	-	-	-	-	-	-	-	-
<i>Rubus</i> sp.	Blackberry/Raspberry	-	-	3	-	-	-	-	-	-	-
<i>Prunus spinosa</i> L.	Sloe stone	1	-	1	-	-	-	-	-	-	-
<i>cf Crataegus</i> sp.	Hawthorn stone	-	-	-	1	-	-	-	-	-	-
<i>Ulex</i> sp.	Gorse	2	-	-	-	-	-	-	-	-	-
<i>Sambucus nigra</i> L.	Elder	1	-	-	1	2	1	3	1	1	-

Other plant parts

<i>Arrhenatherum elatius</i> (L.) P. Beauv. Ex J. & C. Presl	False oat grass, tuber	-	-	1	-	-	-	-	-	-	-
<i>Avena fatua</i> L.	Wild oat, floret base	-	-	-	1	-	-	1	-	-	1
<i>Avena</i> sp.	Oat, awn fragments	-	-	-	-	1	-	-	5	-	-
Cerealia type	Large, cereal sized culm node	-	2	-	-	-	-	-	-	-	-
Poaceae type	Grass, small culm node	-	-	-	-	1	-	-	-	1	-
Poaceae type	Small culm segment	1	-	-	-	-	-	-	-	-	-
Poaceae type	Grass, basal culm/rhizome	-	-	-	-	-	1	-	-	-	-

	Sample	4743	4731	4807	4844	4845	4815	4833	4839	4838	4840
	Context	1115	1093	1306	1359	1360	1313	1337	1355	1356	1357
Poaceae type	Small grass, basal culm/rhizome	++	-	-	-	6	-	1	3	1	1
Poaceae type	rhizome/tuber fragment	-	5	1	+	-	-	-	-	-	-
Large seed/fruit frag		-	-	1	-	1	-	-	-	-	-
Indeterminate	Twigs	-	1	1	++	-	-	-	-	1	1
Non-plant remains											
cf worm capsules, charred		-	-	-	2	-	6	-	1	-	-
Insect fragment (exoskeleton)		-	-	1	-	-	-	-	-	-	-
<i>Cenococcum geophilum</i> Fr	Fungal spores	-	+++	-	-	-	-	-	-	-	-
Ignota		-	-	-	-	-	-	-	4	-	-
Summary data											
	Total Grain	1	5	4	20	9	2	26	5	4	1
	Total Chaff	7	7	28	771	377	11	372	371	152	62
	Total Weed seeds	796	180	161	288	95	341	68	43	76	32
	Total Brassica	216	74	7	12	1	0	6	0	2	4
	Total 'other plant items'	5	11	8	3	11	2	5	10	3	2
	Total <i>Triticum</i> grain	0	3.5	1	3	2	1	9	5	2	1
	Total <i>Triticum spelta/dicoccum</i> glumes	7	7	27	771	374	11	372	371	152	62
	Number of <i>Triticum</i> glume bases to grain (glumes/grain)	-	2	27	257	187	11	41.3	74.2	76	62

Table 1.3 Archaeobotanical remains from Four-post structure Building 2 phase iii

	Sample	4831	4831	4831	4832	4834
	Context	1331	1331	1331	1334	1335
	Feature	1336	1336	1336	1336	1336
	Feature type	Upper fill		Combined total	Middle fill	Lower fill
	Vol (l) of sample			100	40	75
	Mesh size	>1mm	<1mm			
	Fraction sorted	100	25		25%	100
Cereal Grain						
<i>Triticum spelta</i> L.	Spelt wheat grain	-	-	-	-	1
<i>Triticum</i> cf. <i>spelta</i> L.	cf. Spelt wheat grain	1	-	1	-	-
<i>Triticum</i> cf. <i>dicoccum</i> Schübl.	cf. Emmer wheat grain	3	-	3	-	-
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt wheat grain	4	-	4	-	1
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt wheat, short grain	-	-	-	-	1
<i>Triticum</i> sp.	Wheat grain	10	-	10	2	1
<i>Hordeum vulgare</i> L.	Barley, hulled grain	2	-	2	1	-
<i>Hordeum vulgare</i> L.	Barley grain	9	-	9	3	1
Cerealia indet	Indeterminate grain	16	-	16	-	4
Chaff						
<i>Triticum spelta</i> L.	Spelt wheat, glume base	209	2	217	19	118
<i>Triticum spelta</i> L.	Spelt wheat, spikelet fork	4	-	56	-	1
<i>Triticum</i> cf. <i>spelta</i> L.	cf. Spelt wheat glume base	-	-	-	1	-
<i>Triticum spelta</i> L.	Spelt wheat, basal spikelet fork/rachis	1	-	1	-	-
<i>Triticum dicoccum</i> Schübl.	Emmer wheat, glume base	11	-	11	-	5
<i>Triticum dicoccum</i> Schübl.	Emmer wheat, spikelet fork	1	-	1	-	2
<i>Triticum</i> cf. <i>dicoccum</i> Schübl.	cf. Emmer wheat glume base	3	1	7	-	2
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt wheat glume base	228	42	396	65	426
<i>Triticum dicoccum/spelta</i>	Emmer/Spelt wheat spikelet fork	42	2	50	14	50
<i>Triticum</i> sp.	Wheat, hexaploid spikelet base/upper rachis	-	-	-	-	-
<i>Triticum</i> sp.	Wheat, hexaploid rachis internode	6	-	6	-	-
<i>Triticum</i> sp.	Wheat, hexaploid basal rachis internode/node	1	-	1	-	-
<i>Triticum</i> sp.	Wheat, indet rachis internode	2	-	2	-	5
<i>Hordeum vulgare</i> L.	Barley, six row rachis node/internode	-	-	-	1	-
<i>Hordeum vulgare</i> L.	Barley, rachis node/internode	-	-	-	1	-
Other cultivars						
<i>Brassica nigra</i> (L.) W.D.J. Koch	Black mustard	-	-	-	-	1
<i>Brassica/Sinapis</i> sp.	Cabbages/Mustards	3	-	3	1	-
cf <i>Brassica/Sinapis</i> sp.	cf. Cabbages/Mustards	-	-	-	-	1
Herbaceous seeds						
<i>Ranunculus acris/repens/bulbosus</i>	Buttercup	-	-	-	1	-
<i>Caltha palustris</i> L.	Marsh-marigold	-	-	-	1	-
<i>Urtica dioica</i> L.	Stinging nettle	-	-	-	1	-

	Sample	4831	4831	4831	4832	4834
	Context	1331	1331	1331	1334	1335
<i>Chenopodium album</i> L.	Fat hen	6	16	70	19	6
<i>Atriplex</i> sp.	Oraches	7	3	19	11	6
Chenopodiaceae	Goosefoots	9	12	57	29	3
<i>Montia fontana</i> subsp. <i>chondrosperma</i> (Fenzl) Walters	Blinks	-	2	8	-	2
<i>Stellaria media</i> (L.) Vill.	Common chickweed	-	6	24	25	-
cf. <i>Stellaria media</i> (L.) Vill.	cf. Common chickweed	-	-	-	15	26
<i>Stellaria graminea</i> L.	Lesser stickwort	-	1	4	-	-
Caryophyllaceae	Pinks, indeterminate seeds	3	3	15	12	5
<i>Spergula arvensis</i> L.	Corn spurrey	-	4	16	1	-
cf <i>Persicaria</i> sp.	cf. <i>Persicaria</i> , internal cotyledon	-	-	-	-	4
<i>Persicaria lapathifolia</i> (L.) Gray	Pale persicaria	90	2	98	88	47
<i>Persicaria lapathifolia/maculosa</i>	Pale persicaria/Redshank	59	1	63	8	10
<i>Persicaria maculosa</i> Gray	Redshank	5	-	5	4	2
<i>Polygonum aviculare</i> L.	Knotgrass	6	2	14	1	-
<i>Fallopia convolvulus</i> (L.) Á. Löve	Black-bindweed	10	-	10	3	2
cf <i>Fallopia convolvulus</i> (L.) Á. Löve	cf. Black-bindweed	-	-	-	1	-
Polygonaceae indet.	Knotweeds	2	-	2	-	-
<i>Rumex acetosella</i> L.	Sheep's sorrel	-	2	8	2	3
<i>Rumex</i> sp.	Docks	2	-	2	1	-
cf <i>Rumex</i> sp.	cf. Docks	-	-	-	-	2
<i>Viola</i> section <i>Viola</i>	Sweat/Hairy violet (large seeded)	-	1	4	-	-
Brassicaceae	Mustard family	-	-	-	1	-
<i>Vicia/Lathyrus</i> sp.	Vetch/Vetchling/Tare, small seeded	4	-	4	3	1
<i>Lotus/Trifolium</i> type	Trefoil/Clover	-	1	4	4	3
cf <i>Galeopsis</i> sp.	cf Hemp nettle	5	-	5	-	-
<i>Plantago lanceolata/media</i>	Ribwort/Hoary plantain	-	-	-	-	2
<i>Galium aparine</i> L.	Cleavers	1	-	1	-	-
Rubiaceae	Bedstraw	1	-	1	-	-
cf <i>Tripleurospermum inodorum</i> (L.) Sch. Bip	cf. Scentless mayweed	-	-	-	1	-
<i>Carex</i> sp.	Sedge, 2 sided	2	-	2	2	1
<i>Carex</i> sp.	Sedge, 3 sided	3	2	11	1	2
<i>Lolium/Festuca</i> type	Rye-grass/Fescue	6	-	6	-	-
<i>Avena</i> sp.	Oats	-	-	-	-	-
<i>Poa annua</i> L./ <i>Phleum</i> sp. type	Annual meadow grass/Cat's tail	-	4	16	10	10
<i>Bromus</i> sp.	Brome grass	48	-	48	1	23
Poaceae	Small seeded grasses	3	12	51	1	-
Poaceae	Large seeded grass, distal end	-	-	-	3	-
Poaceae	Large seeded grasses	3	3	15	-	4
Indet		47	29	163	50	25
Shrubs and trees (seeds)						
<i>Rubus</i> sect. <i>glandulosus</i> Wimm. & Grab	Blackberry/Bramble	2	-	2	2	-
<i>Rubus</i> sp.	Blackberry/Raspberry	-	-	-	1	-

	Sample	4831	4831	4831	4832	4834
	Context	1331	1331	1331	1334	1335
<i>Corylus avellana</i> L.	Hazel nut shell fragment	-	-	-	1	-
<i>Crataegus monogyna</i> Jacq.	Hawthorn stone	-	-	-	-	1
<i>Sambucus nigra</i> L.	Elder	7	-	7	1	4
Other plant parts						
Rosaceae type	Thorn	1	-	1	-	-
<i>Avena fatua</i> L.	Wild oat, floret base	-	-	-	-	2
<i>Avena</i> sp.	Oat, awn fragments	-	-	-	-	8
Cerealia (culm node)	Large, cereal sized culm node	2	1	6	-	2
Poaceae type	Grass, small culm node	3	-	3	1	8
Poaceae type	Small culm internode	-	-	-	1	3
Poaceae type	Grass, basal culm/rhizome	5	-	5	-	-
Poaceae type	Small grass, basal culm/rhizome	-	-	-	-	7
Poaceae type	rhizome/tuber fragment	-	3	12	-	-
Large seed/fruit frag		3	-	3	-	-
Non-plant remains (not charred)						
Insect head		1	-	1	-	-
<i>Cenococcum geophilum</i> Fr	Fungal spores	++	-	++	-	-
Summary data						
	Total Grain	45	0	45	6	9
	Total Chaff	556	49	754	115	657
	Total Weed seeds	322	106	746	300	189
	Total Brassica	3	0	3	1	2
	Total 'other plant items'	23	4	39	7	35
	Total <i>Triticum</i> grain	28	0	18	2	4
	Total <i>Triticumspelta/dicocum</i> glumes	547	49	743	113	657
	Ratio of <i>Triticum</i> glume bases to grain (glumes/grain)	30.4	-	41.3	56.5	164.3

+ = present; ++ = common; +++ = abundant

APPENDIX 2

Samian stamps recorded from all excavations at Chester amphitheatre

Potter (NoTS 2008-11)	Potter's activity date-range (NoTS)	Die	Previous excavation or publication	Current phasing or previous stratigraphy	Current Cat No
Silvanus i	30–80	8h		Ph 10	51
Celadus	50–75	1b'	Thompson 1976, 206	u/s	
Sabinus ii	50–80	12a	Thompson 1976, 206	'Seating bank'	
Cunarus i?	55–80	2a or 2b?		post-Roman	84
Albanus ii	60–80	1b'	Newstead and Droop 1932a, 24	'packing round the large post-hole'	
Firmo i	60–85	4a'	Thompson 1976, 206	u/s	
Iustus i or Iulius ii?	60–85 or 70–90	?		post-Roman	86
Peregrinus i	65–85	3a (i)	Newstead and Droop 1932a, 25	-	
Calvus i	65–90	5ff	Thompson 1976, 206	u/s	
Calvus i	65–90	5v	Newstead and Droop 1932a, 24	Ursuline Convent site, casual find	
Calvus i	65–90	unlocated in NoTS	Newstead and Droop 1932a, 24	Mixed deposit at west end of new road	
Germanus i	65–90	13d	Newstead and Droop 1932a, 24	refuse or infill 'under make-up of seating bank'	
Q. Iulius Habi-	65–90	1a		Ph 3	2
Patricius i	65–90	6c	Thompson 1976, 206	u/s	
Patricius i	65–90	13g'	2002 unpublished	post-Roman?	Appdx 3
Rufinus iii	65–90	18a	Thompson 1976, 206	u/s	
Pontus	65–95	24a		Ph 5	6
Severus iii	65–95	7t		Ph 6	21
Iullinus i	65–110	3a	2001 unpublished	current Ph 7	Appdx 3
Censor i	70–90	3b	2001 unpublished	post-Roman?	Appdx 3
Ponteius	70–95	1a or 1a'	1929 unpubl, Grosvenor Museum ref GM 107M	-	
Flavius Avi-	70–100	1b'	Thompson 1976, 206	u/s	
Vitalis ii	70–100	23b''		Ph 11b	72
Vitalis ii	70–100	8i	Thompson 1976, 206	'Seating bank'	
Vitalis ii	70–100	8h	Newstead and Droop 1932a, 25	refuse or infill 'under make-up of seating bank'	
Cosius lucundus	75–110	1a		Ph 6	22
Cosius lucundus	75–110	1a'		post-Roman	90
Virilis ii?	80–105	6c?		post-Roman	88
Ego	80–110	1a		post-Roman	89
L. Tr- Masculus	85–105	4a		Ph 5	8
Sulpicius	85–110	8a		Ph 11b	70
C. Iulius Primig- Sur-	90–120	3a		Ph 10	52
C. Iulius Primig- Sur-	90–120	3a	Thompson 1976, 206	u/s	
Gabrillus i	130–155	new die		post-Roman	91
Severus vi, or Severus v?	160–210, or 125–150?	12a? or 3a?		post-Roman	92

APPENDIX 3

A brief summary of Roman pottery
from the 2000–03 excavations

1 Samian ware

Year of excavation	Sherds	Vessels (max nos)	Weight	EVEs (by rim)	SG vessels (max nos)	CG vessels (max nos)	EG vessels	Les Martres products
2000	35	34	197 g	0.46	31	3		2
2001	84	81	506 g	1.01	72	9		2
2002	42	37	182 g	0.49	33	4		1
2003	89	89	395 g	0.86	79	10	1	1
TOTAL	250	241	1.28 kg	2.82	215	26	1	6

2000 Excavation

Selected items:

- Context (13). SF 19. SG moulded bowl form 29. Tiny fragment of decoration (festoons with astragalus; a wavy line separates vertically). Reused as counter, *c* 9 × 11 mm diameter. Weight 1 g. *c* AD 70–110.
- Context (14). SG moulded bowl form 29. Pan head-butts a goat (Osw 727) as used by potters including Mommo. A burnt sherd; weight 11 g. *c* AD 70–85/90.
- Context (15). SG beaker form 67. Basal line overlapped by a fragment only of moulded decoration. Weight 2 g. *c* AD 70–110.

2001 Excavation

Potters' stamps

- Trench XII, context (211). SG dish form 15/17 or 18

- stamped [O]FC·EN by Censor i, die 3b; (*NoTS* 2008, vol 3, 335): potter active AD 70–90. There are two other Chester examples of die 3b listed, on form 18: one was from the fortress, Hunter St School 1979–81 (Ward unpublished); another was found at Holt (Dickinson in Ward 1998, 65). Weight 2 g. AD 70–90.
- Trench XI, context (224). SF 128. SG dish form 15/17 stamped [IV]LLINI· by Iullinus i, die 3a; (*NoTS* 2009, vol 4, 361). Potter active AD 65–110. Footring a little worn. Other dies represented at Chester fortress include die 3b from Northgate Brewery 1972 on form 18, and die 3c on form 15/17 from the *canabae*. See Sam Cat no 45 (i) and table below. The dish was probably made in the range *c* AD 65/70–85.

Trench XI, Context M224: equivalent of Phase 7. Contents: samian ware

Fabric	Form	Notes	Rim/foot measurements	Production date-range, c AD
SG	15/17	Dish: a) Glossy chip and adjoining flake of wall/base junction, b) worn footring with surfaces partially dulled; basal stamp by .Iullinus i, die 3a (see above). Large round hole, diameter c 7–8 mm, drilled through base above footring. Weight 72 g. SF 128	Foot: 47 % at 8 cm	65/70–85
SG	18R	Basal sherd of dish. weight 10 g		70/80–110
SG	18R	Unworn footring of dish; surfaces partially dulled. c 70–100. 35 g	Foot: 20 % at 11 cm	70–100
SG	27	Rim sherds of two cups with no internal groove. Weight 10 g	Rims 5 %; 25 % at 10 cm	70–100
SG	27	Fragment of wall of cup. Weight 4 g		70–110
SG	29 or 37	Moulded bowl: fragment only of the decoration. Weight 1 g		70–90/100
SG	37	Moulded bowl: zonal decoration with a winding scroll and goose standing right (CC type Bf.5) above an indistinct fragment. Influenced by form 29 (cf in the Cala Culip IV wreck, Nieto and Puig 2001, 255, no 196). The sherd may have been cut down parallel to the horizontal wavy line. Surfaces dulled. Weight 3 g		75–90

2002 Excavation*Selected items*

- 6 Trench 12, context (318) SF 155. SG cup form 27, grooved internally, not externally. Stamped PATRI retrograde. Patricius i, die 13 g' which occurs only on forms 27 and 27 g, and is found in Britain only at southern sites (*NoTS* 2011, vol 7, 79). Several other dies are recorded in Chester. Patricius i is listed as active AD 65–90. Footring unworn. Weight 38 g.
- 7 Context (295) SG dish, c AD 70–100. Traces of lead in a round repair hole. Weight 1 g.
- 8 Context (290). CG moulded bowl, form 37 with row of corded rings (Rogers 1974, C293) in place of an ovolo above the beadrow. A product of Les Martres-de-Veyre, c AD 100–125 Weight 3 g.

2003 Excavation*Selected items*

- 9 Context (382). SG moulded bowl form 37 with divided panels. Leaf type motifs to left of panel containing a wheel of a chariot. Weight 2g. c AD 70–110.
- 10 Context (383). SG beaker, form 67 with figure of cupid playing a lyre (Osw 501) to left of vertical beadrows. Cupid: cf Mees 2014, CUP-r 003 recorded for Calvus i, Censor i, Frontinus i, Logimus. Type Osw 501 was recorded on form 29 by potters incl Mommo and 37 by such potters as Frontinus and Mercator as well as Mommo. The type occurs on forms 29 and 37 at the Cala Culip IV wreck (c AD 78–82): CC type Ab.21. A Flavian-Trajanic Product. Messy work, with dull surfaces. c AD 70/80–110.
- 11 Context (383). EG moulded bowl form 37; a heavy footring and base, burnt to a light orange but probably

Rheinzabern ware, with fingerprints on its irregular slip. The uneven footring is smoothed towards the inner edge where the standing surface was not flat. Probably c 180/200–240. Weight 40 g.

- 12 Context (475). CG moulded bowl form 37 with fragment of shield (Rogers U210) as used by Servus iii, Cinnamus ii and Doeccus i, but this bowl was probably not a late product. It may represent the style of Servus iii; see for example, Stanfield and Simpson pl 138.1. Weight 1 g. c AD 140/150–180.

2 Coarse, and other fine wares

The level of analysis and reporting on the pottery from previous excavations on the site of the amphitheatre varies considerably.

The account of the discovery of the amphitheatre in 1929 by Williams records two mortaria stamps and 'much 1st century pottery' (Williams 1929, 218). He goes on to say that the 'ceramic evidence fixed the date of the structure as of the 1st century' (*ibid*).

The decorated samian and samian potters' stamps along with selected coarse pottery from the work undertaken by Newstead and Droop in 1930–1, is reported on in 1932 (Newstead and Droop 1932, 22–5). The criteria for publishing the pottery was 'from well stratified deposits, and ... apparently contemporary with the primary foundation of the building; and a few examples of later periods which have been dated chiefly by associated finds and may help to throw some light on the later Phases of the occupation of the site' (*ibid*, 25). Subsequent publication in 1948 reported on the finds from the sites investigated in 1934 (Newstead 1948, 99–105). This again included the

decorated samian and records that ‘there were 31 fragments (of coarse pottery), belonging for the most part to cooking pots, in both red and fumed grey clay; but two rims only were represented and these were clearly of Flavian origin’ (*ibid*, 102). A fragment of a rouletted eggshell ware vessel was also recorded as being found during the construction of ARP shelters on the site in 1939 (p 13).

The Roman pottery from the major excavations in the 1960s was re-packaged in 2003, at which time a basic quantification of the samian, fine wares and coarse wares was undertaken. This equated to a sherd count only, per context or ‘bag number’ and brief notes were made on the assemblage. In total, 4,457 sherds of Roman pottery were recovered from these excavations. In some cases spot dates for the layers (fine and coarse wares only) have been noted. Thompson published those stratigraphic groups that helped to date the ‘period of construction of the stone amphitheatre, any subsequent structural changes, and its final abandonment’ (Thompson 1976, 200). This included two groups of pottery, including samian, relating to the construction of his ‘stone amphitheatre’ which are unfortunately now lost. One of the groups was from a sealed rubbish pit (F13), within the seating bank, excavated in 1960, and assumed to be contemporary rubbish associated with the construction of the amphitheatre (*ibid* 163), which was to the east of the east sidewall of the northern main entrance. Thompson describes the pit as being ‘prolific in pottery, both Samian and coarse ware It showed a fair degree of wear and it is a reasonable assumption that it represents a *terminus post quem* of at least AD 80’, the samian falling within the period AD 70–110 (*ibid* 163–4). The second group reported on, recovered in 1965, was from the rubble layer behind the arena wall north of the concrete retaining wall. Once again, the samian was predominantly Flavian, and the coarse ware is described as Flavian/Trajanic (*ibid* 149). The samian is listed and the potters’ stamps recorded and illustrated from these two assemblages. The mortaria and amphorae stamps and an example of graffiti on the rim of an amphora (*ibid* 187–8 and fig 22.13) are catalogued. Details of other sherds from the seating bank make-up and those found in the vicinity of F13 and sherds from different find spots that can ‘probably be attributed to the construction of the stone amphitheatre, including the primary floor of the northern main entrance’ are also published (*ibid* 205–6). A selected group of coarse wares are illustrated, and a small assemblage of comparable date recovered from the seating bank in 1961 are listed, along with a rim sherd from below the secondary passage floor of the east entrance and pottery from the soil beneath the late 3rd-century flooring of the arena.

The trenches excavated by Lancaster University Archaeological Unit, thirty-five in total, as a result of redevelopment proposals for Dee House in 1993, inevitably produced finds of Roman date. The majority of the material comprises coarse wares, both oxidised and reduced wares which are mostly represented by small to medium-sized

undiagnostic body sherds, with few dateable rims (Buxton 1993, 176). Quantification of the pottery is by sherd count only. The ceramics are described as being well preserved, with little physical deterioration, even amongst the soft-fired Romano-British coarse wares (*ibid* 175). The general date range falls within the later 1st and 2nd centuries AD, which is also true of the samian vessels. Predominantly jars and flagons, it is suggested that much of the coarse wares derive from kilns at Holt and Wilderspool with just a small quantity of early-mid 2nd century black-burnished ware jars from Dorset. It is noted that the fine wares, except for the samian, amount to no more than two sherds of a roughcast beaker, probably of Wilderspool origin, and two sherds in a mica-dusted fabric, the source of which is unknown. Amphorae, too, are only represented by a small assemblage. Although it is suggested that the lack of fine wares may be significant, the report also notes that the assemblage is small and cannot be seen as anything but a random sample of material from the site (*ibid* 176). This may be a consequence of the excavation strategy, which determined that most trenches were excavated only to the top of significant, undisturbed archaeological deposits. It concludes that the pottery seems to be domestic in nature, deriving from servicing the needs of visitors to the amphitheatre for pre-prepared food and drink (*ibid* 179), although this material can now be understood in terms of the material imported for the construction of the seating banks.

Excavations and subsequent watching briefs by Gifford in 1999–2001 produced an assemblage of 1,270 sherds of Roman pottery which has been quantified by sherd count and weight, by fabric and form. A summary is included in the report (Garner 2001). The majority of the pottery, comprising large and unabraded sherds, is local oxidised and reduced wares of the 1st and 2nd centuries. Thirty per cent of the assemblage was recovered from just one pit in Phase 1, associated with animal bone and other domestic refuse. Other types include *Verulamium* mortaria, amphorae, local finewares and mid/late 2nd-century black-burnished ware. The forms, typical of a Chester assemblage, include carinated bowls, ring-necked flagons and jars with everted rims.

The pottery from excavations carried out by the Archaeological Service of Chester City Council, in 2000, has been quantified by common name and form with reference to Chester fabrics and forms, by sherd count and weight for each stratigraphic unit. A total of 426 sherds (3,688 g) was recovered. The majority of the pottery was locally made and dates to the 1st and 2nd centuries, the exceptions being a late 2nd–early 3rd-century black-burnished ware bowl and a possible 4th-century calcite-gritted vessel, which were recovered from the backfill of a 1967 trench and modern make-up deposits respectively. The main vessels are jars, beakers, bowls and flagons. Only a small percentage of traded wares are present, including white wares from Warwickshire and Dorset BB1. Imported wares are represented by 36 sherds of samian, 21 amphorae

sherds and three colour-coated vessels. The majority of the material is residual and from post-Roman contexts, the exceptions being small assemblages from Trenches II, V and IX, all of which date to the late 1st–early 2nd centuries.

The pottery from the 2001 season has been quantified to the same level as the 2000 assemblage. A total of 881 sherds of fine and coarse wares (not including the samian) (9,566 g) was recovered but comprised only very small assemblages from Roman layers such as a pebble surface and possible foundation trench from Trench X, with a larger assemblage from the fill of a pit in Trench XI. Typical Chester fabrics and forms are present, such as jars, lids, bowls, mortaria and amphorae. The ‘seating bank’ of Trench XII only produced nine sherds of pottery. One sherd worthy of note, however, is a body sherd of a ‘London ware’ bowl in a fine black-slipped fabric with compass

drawn semi-circles and vertical grooved parallel lines, not seen in any other assemblage from the amphitheatre (*see* Marsh 1978 and Tyers 1996, 170–1 for similar forms). This dates from the late 1st–mid 2nd century. The majority of the pottery from Roman contexts, however, is dated to the late 1st–early 2nd century.

The assemblage from the excavations in 2002 amounts to 439 sherds (2,966 g). No formal assessment has been carried out on this assemblage but it appears to date to the 1st–2nd centuries except for some possible later white wares from the Mancetter-Hartshill kilns, including mortaria. A slightly larger group of material (727 sherds (7,752 g) was recovered from the 2003 excavations which again appears to be 1st–2nd century in date, except for some possible late 2nd-century black-burnished ware and mortaria.

APPENDIX 4

Roman pottery fabric descriptions

The Roman pottery has been broadly classified into samian, fine and coarse wares. The fine and coarse wares are then sub-divided into categories using descriptive or common ware names such as white-slipped orange or red colour-coated. Within each of these categories the specific fabrics are assigned a unique number, referred to in the text as Chester fabric number. Fabrics referred to in the report are listed below. Where appropriate, the corresponding National Roman Fabric Reference Collection name and/or code are also noted (Tomber and Dore 1998). Full descriptions of all the main fabrics (excluding samian) that occur on sites within Chester can be found in Heke and Ward (2012a, Table 1.1). Running in parallel to the fabric series is a numerical form series, with each form being unique to a specific fabric or common ware.

The identification and dating of black-burnished ware is based on Gillam (1976); Oxfordshire ware on Young (2000); Wilderspool vessels on Hartley and Webster (1973) and Hinchliffe and Williams (1992); Severn Valley ware on P V Webster (1976); Holt vessels on Grimes (1930); and Mancetter-Hartshill mortaria on Hemsley (1959).

Amphorae have been classified according to three main fabric groups, fabric numbers 142, 145 and 200. These correspond respectively to Peacock and Williams' classes 27–31 (1986), the south Gaulish wine amphorae; south Spanish olive oil amphorae (classes 15 and 24–6), and all other amphorae fabrics. Individual fabrics in the latter group may be defined when the form can be identified or sherds have a chronological significance.

Those vessels that provide dating evidence for a particular phase or are deemed to be of intrinsic interest have been illustrated.

Fabrics

Fine wares

Chester common name: Black colour-coated ware

Chester fabric name: Lower Rhineland ware

Chester fabric no. 429

NRFRC name and code: Cologne colour-coated ware KOL CC

Source: Cologne

Comments: A distinctive white, hard, fine fabric described by Greene as usually having a rather matt, dark brown

to black colour coating, often with orange or pale brown patches on the exterior, where the vessel was held by the potter before dipping it into the slip (1979, 56).

References: Tomber and Dore 1998, 57

Chester common name: Black colour-coated ware

Chester fabric name: Lyon ware

Chester fabric no. 437

NRFRC name and code: LYO CC

Source: Lyon

Comments: Generally a fine, hard, pale cream fabric, often with a distinctive green tinge. The slip is thin and lustrous and is usually a dark greenish-brown, although the colour may vary from red-brown to nearly black. It always covers the entire surface of the vessel, including the underside of the base. (See Greene 1978, 15 and 1979, 13–14 for a description of the fabric). The only forms recognised at Chester are rough-cast beakers decorated with quartz sand rough-casting. Similar wares were produced at La Butte, as well as at Lyon.

References: Greene 1978; Greene 1979; Tomber and Dore 1998, 59

Chester common name: Black colour-coated ware

Chester fabric name: Undefined black colour-coated ware

Chester fabric no. 205

NRFRC name and code: -

Source: -

Comments: This fabric number covers all black colour-coated wares not further defined.

Chester common name: Red colour-coated ware

Chester fabric name: Holt? red slipped ware

Chester fabric no. 436

NRFRC name and code: -

Source: Holt?

Comments: Corresponds to Grimes' imitation samian slip of red or brown-red colour. Corresponds to Holt coarse orange fabric 154.

References: Grimes 1930, 145

Chester common name: Red colour-coated ware

Chester fabric name: Pompeian red ware

Chester fabric no. 462

NRFRC name and code: Central Gaulish Pompeian red ware CNG PR3

Source: Lezoux?

Comments: Corresponds to Peacock's fabric 3: 'A distinctive soft pale beige ware with few inclusions, though some golden flecks of fine mica are always visible, particularly near the surface' (1977, 154).

References: Tomber and Dore 1998, 44

Chester common name: Red colour-coated ware

Chester fabric name: Undefined red colour-coated ware

Chester fabric no. 206

NRFRC name and code: -

Source: -

Comments: This fabric number covers all red colour-coated wares not further defined.

Chester common name: Black-surfaced ware

Chester fabric name: *Terra-nigra* type

Chester fabric no. 161

NRFRC name and code: -

Source: Possibly continental

Comments: A hard fabric with a smooth feel. Abundant quartz inclusions as well as iron, mica, chert/flint, quartzite and orthoclase.

References: Ward 1981

Chester common name: Black-surfaced ware

Chester fabric name: *Terra-nigra* type ware

Chester fabric no. 163

NRFRC name and code: -

Source: Possibly continental

Comments: A hard fabric with smooth exterior and rough interior. Abundant quartz with mica, chert/flint, sandstone and tourmaline inclusions.

References: Ward 1981

Chester common name: Black-surfaced ware

Chester fabric name: *Terra-nigra* type ware

Chester fabric no. 167

NRFRC name and code: -

Source: -

Chester common name: Black-surfaced ware

Chester fabric name: *Terra-nigra* type ware

Chester fabric no. 203

NRFRC name and code: -

Source: Unprovenanced

Comments: Dark-surfaced vessels which share to a greater or lesser degree in the *Terra Nigra* tradition. Although quartz is the dominant inclusion, sherds are characterised by the presence of very small quantities of greywacke, biotite (black mica) and tourmaline (Ward 1981, 62)

References: Ward 1981, 51–68

Chester common name: Glazed ware

Chester fabric name: Lead-glazed ware

Chester fabric no. 204

NRFRC name and code: -

Source: Holt

Comments: Two main types of pottery vessels were glazed at Holt: cut-glass ware and other imitation samian vessels (Grimes 1930, 177)

References: Grimes 1930, 175–8

Chester common name: White eggshell ware

Chester fabric name: 475

Chester fabric no. -

NRFRC name and code: -

Source: Holt

Comments: Corresponds to Grimes' description of the 'fine white pottery ... made at Holt. [the] commonest forms were small conical cups ... with everted or straight rim and frequently rouletted walls' (1930, 163). Vessels have extremely thin walls.

References: Grimes 1930, 163–4

Chester common name: White eggshell ware

Chester fabric name: Undefined white eggshell ware

Chester fabric no. 211

NRFRC name and code: -

Source: -

Comments: Presumed to be local

References: This fabric number covers all white eggshell ware not further defined.

Chester common name: Orange mica-coated ware

Chester fabric no. 466

NRFRC name and code: -

Source: Holt

Comments: Essentially a mica-coated version of the most common, coarser Holt fabric 152.

Chester common name: Orange mica-coated ware

Chester fabric no. 467

NRFRC name and code: -

Source: Holt

Comments: Essentially a mica-coated version of Holt fabric 154. Sometimes rather soft, with a red-brown core. The amount of quartz in the clay is small but variable.

Chester common name: Orange mica-coated ware

Chester fabric name: Undefined mica-coated ware

Chester fabric no. 209

NRFRC name and code: -

Source: -

Comments: This fabric number covers all orange mica-coated wares not further defined.

Coarse wares

Chester common name: Black-on-brown ware

Chester fabric no. 10

NRFRC name and code: -

Source: Local?

Comments: A soft, sandy, pinkish-grey to reddish-brown fabric with light to very dark grey surfaces and a smooth feel. The inside surface is sometimes the same colour as the core.

Chester common name: Black-on-brown ware

Chester fabric no. 11

NRFRC name and code: -

Source: Local?

Comments: A hard, smooth, brown fabric with very dark grey surfaces and a burnished exterior surface.

Chester common name: Grey ware

Chester fabric name: Undefined grey ware

Chester fabric no. 193

NRFRC name and code: -

Source: -

Comments: This fabric number covers all grey wares not further defined. Products of more than one source.

Chester common name: Misfired/grey ware

Chester fabric name: Chester (Foregate Street?) misfired/grey ware

Chester fabric no. 108

NRFRC name and code: -

Source: Chester

Comments: A hard fabric with a harsh or powdery feel and abundant quartz inclusions. The fabric is apparently identical to the normally fired oxidised Chester fabric 510.

Chester common name: Orange ware

Chester fabric name: Wilderspool? orange ware

Chester fabric no. 151

NRFRC name and code: WIL OX

Source: Wilderspool?

Comments: A hard fabric with a powdery feel.

Chester common name: Orange ware

Chester fabric name: Holt orange ware

Chester fabric no. 152

NRFRC name and code: Holt oxidised ware HOL OX

Source: Holt

Comments: A hard fabric with a harsh or powdery feel. It corresponds to Grimes' 'ordinary tile-red or buff ware ... below standard, soft and coarse in texture, and containing a large quantity of quartz-like material ...' (1930, 144). Presumably the softness is a result of soil conditions at Holt. Holt products cannot be reliably distinguished, except by heavy mineral analysis, from Wilderspool products.

References: Tomber and Dore 1998, 207

Chester common name: Orange ware

Chester fabric name: Holt orange ware

Chester fabric no. 154

NRFRC name and code: Holt oxidised ware HOL OX

Source: Holt

Comments: A hard fabric with a smooth, soapy feel. Essentially this corresponds to Grimes' 'second ... fine ware ... buff, with a buff slip which is generally highly burnished, and of smooth, soapy texture' (1930, 144). This is the Holt counterpart of the so-called 'legionary ware' at Caerleon.

References: Tomber and Dore 1998, 207

Chester common name: Orange ware

Chester fabric no. 171

NRFRC name and code: -

Source: Unknown

Comments: A fairly soft orange/brown fabric, with a rough feel. Abundant quartz and some iron ore.

Chester common name: Orange ware

Chester fabric name: Severn Valley ware

Chester fabric no. 215

NRFRC name and code: [Unsourced] Severn Valley oxidised ware 2 SVW OX 2

Source: Severn Valley

Comments: A hard fabric with a smooth feel. Tomber has noted that this fabric is distinguished by numerous voids, resulting from organic inclusions (correspondence Jan 1981).

References: Tomber and Dore 1998, 149–50

Chester common name: Orange ware

Chester fabric name: Severn Valley ware

Chester fabric no. 216

NRFRC name and code: [Unsourced] Severn Valley oxidised ware 2 SVW OX 2

Source: Severn Valley

Comments: A hard fabric with a harsh feel, 'quartz-rich' and recognised by the abundance of visible inclusions. The presence of rhyolite and pyroxene may suggest a source in the Cheshire Plain.

References: Tomber and Dore 1998, 149–50

Chester common name: Orange ware

Chester fabric name: Severn Valley ware

Chester fabric no. 512

NRFRC name and code: SVW OX 2

Source: Wroxeter?

Comments: A hard fabric with a smooth feel. Characterised by varying quantities of large quartz in a clean, smooth clay matrix with a few air-holes. Other inclusions: quartzite, rhyolite and sandstone.

References: Webster 1976, Evans, Jones and Ellis 2000

Chester common name: Orange ware

Chester fabric name: Cheshire Plain orange ware

Chester fabric no. 537

NRFRC name and code: -

Source: Cheshire Plain

Comments: A hard fabric with a rough feel. Quartz and

black grain inclusions. Similar to Fabric 106 in inclusions and texture but not as coarse and friable.

Chester common name: Orange ware

Chester fabric name: Undefined orange ware

Chester fabric no. 194

NRFRC name and code: -

Source: -

Comments: This fabric number covers all orange wares not further defined. Products of more than one source.

Chester common name: Orange ware

Chester fabric name: Orange mortarium fabric

Chester fabric no. 139

NRFRC name and code: HOL OX

Source: Holt

Comments: A hard fabric with a smooth feel. Quartz and black grain inclusions with quartzite trituration grits. Similar to fabric 531 but with a less 'dense' fabric and laminar fracture.

Chester common name: Orange ware

Chester fabric name: Wroxeter? orange mortarium fabric

Chester fabric no. 140

NRFRC name and code: Wroxeter? oxidised ware WRX OX?

Source: Wroxeter?

Comments: A hard fabric with a harsh feel; characterised by a pimply surface, numerous, easily visible quartz grains in a rather poorly levigated grey core. Comparable to Wilderspool or Wroxeter? white-slipped orange mortarium fabric 528 and Wilderspool? orange mortarium fabric 536, in ascending order of coarseness.

References: Tomber and Dore 1998, 178

Chester common name: Orange ware

Chester fabric name: Orange mortarium fabric

Chester fabric no. 531

NRFRC name and code: HOL OX

Source: Holt

Comments: A hard fabric with a powdery fabric. Quartz and black grain inclusions. Angular quartz trituration grits. Corresponds to Grimes' description of the 'ordinary tile-red or buff ware' (Grimes 1930, 144).

References: Grimes 1930

Chester common name: Orange ware

Chester fabric name: Orange mortarium fabric

Chester fabric no. 532

NRFRC name and code: HOL OX

Source: Holt

Comments: A very hard fabric with a smooth feel. Angular quartz trituration grits. Corresponds to Grimes' 'hard dark red ware' (1930, 144).

References: Grimes 1930

Chester common name: Orange ware

Chester fabric name: Wilderspool? orange mortarium fabric

Chester fabric no. 536

NRFRC name and code: WIL OX?

Source: Wilderspool

Comments: A hard fabric with a harsh feel, brownish in colour with a grey core. Characterised by a poorly levigated, rather laminar fabric, with copious quartz grains easily visible, resulting in a pimply surface. Comparable to Wilderspool? white-slipped orange mortarium fabric 528 and Wroxeter? orange mortarium fabric 140, in descending order of coarseness.

References: Tomber and Dore 1998, 121–2

Chester common name: Orange ware

Chester fabric name: Orange mortarium fabric

Chester fabric no. 543

NRFRC name and code: -

Source: Cheshire Plain?

Comments: A hard fabric with a powdery feel. Abundant quartz inclusions along with red iron ore and black grains. Characteristic pale core. Mixed trituration grits.

Chester common name: White-slipped orange ware

Chester fabric name: Wilderspool? white-slipped orange fabric

Chester fabric no. 106

NRFRC name and code: WIL WS

Source: Wilderspool?

Comments: A hard fabric with abundant quartz inclusions. Characterised by harsh 'pimply' surface and by the very coarse texture of the fabric.

Chester common name: White-slipped orange ware

Chester fabric name: Chester (Foregate Street?) white-slipped orange mortarium fabric

Chester fabric no. 246

NRFRC name and code: -

Source: Chester

Comments: A hard fabric with a harsh or powdery feel and abundant quartz inclusions. Recognised by brown surfaces, a thin, poorly applied slip scarcely covering the pimples of the harsh surface and the trituration grit of mixed materials. Compare to Chester white-slipped orange fabric 509. Only generally finer trituration grits distinguish it from Wilderspool or Wroxeter? mortarium fabric 528.

Chester common name: White-slipped orange ware

Chester fabric name: Chester (Foregate Street?) white-slipped orange ware

Chester fabric no. 509

NRFRC name and code: -

Source: Chester

Comments: A hard fabric with a harsh feel and abundant

quartz inclusions. Consistently brown surface on exterior, a noticeably harsh, almost pimply surface with thin, poorly applied slip. David Williams has noted that the Chester/Foregate Street sherds are coarser-textured than Holt or Wilderspool, but not certainly distinguished petrologically (correspondence April 1982). This is a white-slipped version of local? fabric 10. The mortarium version is Chester fabric 246.

Chester common name: White-slipped orange ware

Chester fabric name: Wilderspool or Wroxeter? White-slipped orange mortarium fabric

Chester fabric no. 528

NRFRC name and code: Wilderspool or Wroxeter? WIL WS or WRX WS?

Source: Wilderspool or Wroxeter?

Comments: A hard fabric with a harsh or powdery feel. Macroscopically similar to Wroxeter orange mortarium fabric 140 but with a white slip and coarser; also to Wilderspool? orange mortarium fabric 536, which is coarser still. Characterised by numerous, easily visible quartz grains, a poorly levigated fabric and a grey core. Distinguishable with difficulty from Cheshire fabric 246.

References: Tomber and Dore 1998, 123 and 180

Chester common name: White-slipped orange ware

Chester fabric name: Undefined white-slipped orange ware

Chester fabric no. 199

NRFRC name and code: -

Source: -

Comments: This fabric number covers all white-slipped orange wares not further defined.

Chester common name: White-on-grey

Chester fabric name: Chester (Foregate Street?) misfired white-on-grey

Chester fabric no. 244

NRFRC name and code: -

Source: Chester

Comments: A hard and sandy fabric with a harsh feel. Abundant quartz inclusions together with flecks of mica, sandstone and some quartzite, feldspar, iron ore and pyroxene.

Chester common name: Black-burnished ware

Chester fabric name: Black-burnished ware category 1

Chester fabric no. 19

NRFRC name and code: (South-east) Dorset black-burnished ware DOR BB1

Source: Wareham/Poole harbour

Comments: A hard fabric with a harsh feel, tempered with abundant inclusions of medium-grained quartz sand. Handmade and fired in bonfires; the black colouring is the result of soot-soaking. Burnished surfaces, sometimes

plain but usually decorated with burnished cross-hatching, inverted 'V'-shapes or intersecting arcs.

References: Tomber and Dore 1998, 127

Chester common name: White ware

Chester fabric name: Radlett/Brockley Hill white ware

Chester fabric no. 17

NRFRC name and code: *Verulamium* region white ware VER WH

Source: Greater London and Hertfordshire

Comments: A hard fabric with a powdery feel. Characterised by abundant quartz in a pumice-like fabric, with rare inclusions of red iron ore and flint. *Verulamium* region products are known from Radlett, Brockley Hill and Verulam Hills Field.

References: Tomber and Dore 1998, 154–5

Chester common name: White ware

Chester fabric no. 137

NRFRC name and code: -

Source: Unprovenanced

Comments: White ware not further defined.

Chester common name: White ware

Chester fabric name: Mancetter-Hartshill mortarium fabric

Chester fabric no. 138

NRFRC name and code: MAH WH

Source: West Midlands

Comments: A hard 'pipe clay' fabric with a smooth feel. Red iron ore and quartz inclusions. Abundant ill-sorted red and black medium-coarse trituration grits. Few stamped Hartshill-Mancetter mortaria are found at Chester; most of the forms are the unstamped ones produced after *c* AD 170.

References: Hemsley 1959, 5–17; Hartley 1973, 44 fig 1, 49 fig 6, 51 fig 8

Chester common name: White ware

Chester fabric name: North Gaulish white mortarium fabric

Chester fabric no. 148

NRFRC name and code: North Gaulish white ware 4 NOG WH 4

Source: Noyon

Comments: Generally cream in colour; often soft and powdery in appearance. Trituration grits of quartz, flint/chert are tiny and common. These often extend over the upper surface of the flange.

References: Hartley and Tomber 2006, 22–4; Tomber and Dore 1998, 75–6

Chester common name: White ware

Chester common name: Undefined white ware

Chester fabric no. 196

NRFRC name and code: -

Source: -

Comments: This fabric number covers all white wares not further defined.

Chester common name: White ware

Chester fabric name: Radlett/Brockley Hill white mortarium fabric

Chester fabric no. 213

NRFRC name and code: VER WH

Source: Greater London and Hertfordshire

Comments: A hard fabric with a harsh feel; abundant quartz and rare red iron ore inclusions. Characterised by abundant quartz in a pumice-like fabric. Small flint trituration grits. Main period of distribution is AD 70–140.

References: Tomber and Dore 1998, 154–5

Chester common name: White ware

Chester fabric name: Oxfordshire white ware mortarium fabric

Chester fabric no. 469

NRFRC name and code: OXF WH

Source: Oxfordshire

Comments: A hard fabric with a powdery feel. Abundant quartz and rare red iron ore inclusions. Scattered mixed translucent quartz trituration grits.

References: Young 2000, 51–79

Chester common name: White ware

Chester fabric no. 757

NRFRC name and code: -

Source: -

Comments: A variant of Mancetter-Hartshill mortarium fabric 138

Chester common name: Shell-tempered ware

Chester fabric name: -

Chester fabric no. 420

NRFRC name and code: (Late) Romano-British shelly ware ROB SH

Source: South Midlands?

Comments: A hard fabric with a harsh feel. Irregularly fired orange/brown or grey/black ware tempered with finely ground shell or other calcareous material. Replaced black-burnished ware at Chester in the AD 350s. Forms seem to have been restricted to jars, flanged bowls and plain-rim dishes. It continued to be produced until the early 5th cent.

References: Tomber and Dore 1998, 212; Tyers 1996, 192

Chester common name: Calcite-gritted ware

Chester fabric no. 791

NRFRC name and code: -

Source: -

Comments: A calcite/calcareous-gritted/tempered fabric. Inclusions are fibrous calcareous matter and most likely a variation of calcite. Clay matrix distinctively micaceous.

Late Iron Age/pre-Roman origin but probably date to early-mid 1st century.

Chester common name: Grog-tempered ware

Chester fabric no. 793

NRFRC name and code: -

Source: -

Comments: A hard hand-made reduced grog-tempered fabric. Black/grey core and surfaces with an uneven/rough feel. Abundant quartz, moderate grog and rare iron ore inclusions with a hackly/irregular fracture. Late Iron Age/early Roman.

Chester fabric name: Amphora fabric

Chester fabric no. 1

NRFRC name and code: Cadiz amphorae CAD AM

Source: Cadiz, southern Spain

Comments: This group includes a wide variety of ovoid forms produced along the southern Spanish coast (types Beltran I, II and III). They seem mainly to have been used to carry fish-based products. The date range varies according to the form, and spans the late-1st century BC to the mid-2nd century AD. The Cadiz fabric is described by Peacock and Williams as a 'hard, slightly rough, sandy fabric, with rounded pieces of red iron ore scattered sparsely throughout, reddish-buff [in colour] often covered by an off-white slip' (1986, 121).

References: Tomber and Dore 1998, 106

Chester fabric name: South Gaulish amphora

Chester fabric no. 142

NRFRC name and code: Gaulish amphorae 1 GAL AM1

Source: Gallia Narbonensis

Comments: A soft to hard fabric with a powdery feel. Smoothed horizontal fluting about 8 mm wide at 25–30 mm intervals. Body sherds could come from types Gauloise 1, 3, 4 and 5 or Dressel 28, although Gauloise 4 is the most likely form. Produced at numerous kiln sites in Gallia Narbonensis. The form Gauloise 4 has a fairly thick rounded rim and flat handles with grooves. It had a long life from about the middle of the 1st to the early 4th century. It became the most common wine amphora in Britain in the 2nd century.

References: Tomber and Dore 1998, 93–4

Chester fabric name: South Spanish amphora fabric

Chester fabric no. 145

NRFRC name and code: Baetican (early) amphorae 1 and Baetican (late) amphora 2 BAT AM 1 and BAT AM 2

Source: Baetica, southern Spain

Comments: A hard fabric with a rough feel. Abundant quartz inclusions with moderate white and dark-grey to black fragments. Main forms in Britain are Dressel 20 (Peacock and Williams Class 25) and Cam 185A (Haltern 70; Peacock and Williams Class 15). The globular form

Dressel 20 was produced from the early-1st to the mid-3rd century along the River Guadalquivir in at least a hundred different centres. The main content was olive oil. It is the most common amphora type on Romano-British sites.

References: Tomber and Dore 1998, 84–5; Peacock and Williams 1986, 115–16 and 136–40; Tyers 1996 87–9

Chester fabric name: Carrot amphora fabric

Chester fabric no. 769

NRFRC name and code: Peacock and Williams Class 12 PandW AM 12

Source: Eastern Mediterranean

Comments: A hard rough, very sandy fabric, as described by Peacock and Williams (1986, 109–10); usually brick red or grey. The vessels have a plain or rounded rim, usually without a neck, and a small, tapered body covered with horizontal rilling. They are thought to have carried dates and seem to have originated in a desert environment. May

date from *c* 10 BC to the late-1st century AD.

References: Tomber and Dore 1998, 106

Chester common name: Amphora

Chester fabric no. 792

NRFRC name and code: -

Source: Appears to be the lime-poor version of the Tunisian fabrics NAF AM2, Peacock and Williams type 33.

Comments: A hard fabric with a rough feel. Frequent well-sorted quartz inclusions.

References: Peacock and Williams 1986, 153–4; Tyers 1996, 104–5

Chester fabric name: Undefined amphora fabrics

Chester fabric no. 200

NRFRC name and code: -

Source: -

Comments: Comprises all undefined fabrics.

APPENDIX 5

Roman earth mix (daub) fabric descriptions

Roman daub quantified by period and fabric

Fabric	Roman				Ph: 10–11b				Ph 12–21				Unstrat				Total			
	No	% no	Wt (g)	% wt	No	% no	Wt (g)	% wt	No	% no	Wt (g)	% wt	No	% no	Wt (g)	% wt	No	% no	Wt (g)	% wt
1	247	18.5	247	3.8	7	1.2	13	1	16	10.7	50	4.4	0	0	0	0	270	13	310	2.3
2	255	19.1	1,191	18.2	26	4.4	128	10.1	5	3.4	17	1.2	1	100	18	100	287	13.9	1,354	14.7
3	164	12.3	952	14.6	0	0	0	0	5	3.4	125	8.8	0	0	0	0	169	8.2	1,077	11.7
4	298	22.4	1,532	23.5	6	1	70	5.5	24	16.1	721	50.6	0	0	0	0	328	15.9	2,323	25.2
5	103	7.7	509	7.8	2	0.3	65	5.1	11	7.4	83	5.8	0	0	0	0	116	5.6	657	7.1
6	53	4	76	1.2	78	13.3	295	23.2	0	0	0	0	0	0	0	0	131	6.3	371	4
7	11	0.8	17	0.3	4	0.7	4	0.3	7	4.7	23	1.6	0	0	0	0	22	1.1	44	0.5
8	116	8.7	1,042	16	0	0	0	0	10	6.7	30	2.1	0	0	0	0	126	6.1	1,072	11.6
9	22	1.7	355	5.4	0	0	0	0	0	0	0	0	0	0	0	0	22	1.1	355	3.8
10	24	1.8	123	1.9	0	0	0	0	0	0	0	0	0	0	0	0	24	1.2	123	1.3
11	14	1.1	263	4	423	72.2	530	41.6	31	20.8	125	8.8	0	0	0	0	468	22.6	918	9.9
12	26	2	223	3.4	10	1.7	138	10.8	40	26.8	238	16.7	0	0	0	0	76	3.7	599	6.5
13	0	0	0	0	30	5.1	30	2.4	0	0	0	0	0	0	0	0	30	1.4	30	0.3
Total	1,333	100	6,530	100	586	99.9	1,273	100	149	100	1,412	100	1	100	18	100	2,069	100	9,233	98.9

Fabric 1

Fabric 1 comprises a clay matrix with inclusions of sand, ranging from rare to medium-high density of quartz sand. In the coarser examples, the sand was probably deliberately added to the clay to give the mix bulk and stability, rather than being naturally present. 2.3 % (by weight) of fragments occur in this fabric.

Fabric 2

Fabric 2 comprises a clay matrix with inclusions of sand and vegetable matter, ranging from rare to medium-high density of quartz sand, and elongate voids. Vegetable matter was frequently added as a reinforcement to help hold the mix together and to control shrinkage. In examples where the voids are rare, this indicates that they occur naturally in the clay and may represent small pieces of root material (Williams 2010, 121). This fabric is the second most common, comprising 14.7 % of fragments.

Fabric 3

Fabric 3 is similar to Fabric 2 but with the addition of rare to occasional lime or chalk, which ranges in size from tiny flecks to small rounded or sub-rounded fragments. 11.7 % of fragments occur in this fabric.

Fabric 4

Fabric 4 is similar to Fabric 2 but with the addition of rare to occasional rounded to sub-angular gravels and rare pebbles. This fabric is the most common, comprising 25.2 % of fragments.

Fabric 5

Fabric 5 is similar to Fabric 2 but with the addition of rare to occasional fragments of charcoal, ranging in size from small flecks to large pieces. 7.1 % of fragments occur in this fabric.

Fabric 6

Fabric 6 is similar to Fabric 1 but with the addition of rare to occasional fragments of charcoal, ranging in size from small flecks to large pieces. 4.0 % of fragments occur in this fabric.

Fabric 7

Fabric 7 is similar to Fabric 6 but with the addition of rare to occasional rounded to sub-angular gravels and rare pebbles. Only 0.5 % of fragments occur in this fabric.

Fabric 8

Fabric 8 is similar to Fabric 1 but with the addition of

rare to occasional rounded to sub-angular gravels and rare pebbles. 11.6 % of fragments occur in this fabric.

Fabric 9

Fabric 9 is similar to Fabric 1 but with the addition of rare to occasional lime or chalk, which ranges in size from tiny flecks to small rounded or sub-rounded fragments. 3.8 % of fragments occur in this fabric.

Fabric 10

Fabric 10 is similar to Fabric 9 but with the addition of rare to occasional fragments of charcoal, ranging in size from small flecks to large pieces, as well as rare to occasional rounded to sub-angular gravels and rare pebbles. 1.3 % of fragments occur in this fabric.

Fabric 11

Fabric 11 is similar to Fabric 9 but with the addition of rare

to occasional fragments of charcoal, ranging in size from small flecks to large pieces, as well as rare to occasional vegetable matter in the form of elongate voids. 9.9 % of fragments occur in this fabric.

Fabric 12

Fabric 12 is similar to Fabric 9 but with the addition of rare to occasional rounded to sub-angular gravels and rare pebbles, as well as rare to occasional vegetable matter in the form of elongate voids. 6.5 % of fragments occur in this fabric.

Fabric 13

Fabric 13 is similar to Fabric 8 but with the addition of rare to occasional lime or chalk, which ranges in size from tiny flecks to small rounded or sub-rounded fragments. Just 0.3 % of fragments occur in this fabric.

APPENDIX 6

Quantification of archaeobotanical Remains in Roman and early post-Roman samples

Roman samples

		Sample	4783	4295	4309	4342	4613	4662	4636
		Context	1216	2450	2543	2498	823	924	876
		Phase	4	6	6	6	6	6	7
		Context type	Cess pit fill	Seating bank dump	Seating bank dump	Seating bank dump	Seating bank dump	Fill of timber slot	external posthole
Taxa	Common name								
Cereal Grain									
<i>Hordeum vulgare</i> L.	Barley, hulled		4	-	1	-	1	-	-
<i>Hordeum vulgare</i> L.	Barley		2	-	-	3	-	-	-
<i>Triticum dicoccum/spelta</i>	Spelt/Emmer		3	-	-	1	-	-	-
<i>Triticum</i> sp.	Wheat, indeterminate		-	-	-	2	1	1	-
Cerealia indet	Indeterminate grain		6	-	2	4	1	-	1
Cerealia indet	Detached embryo		-	1	-	-	-	-	-
Cereal Chaff									
<i>Triticum dicoccum/spelta</i>	Spelt/Emmer glume base		1	-	-	1	-	-	-
<i>Triticum dicoccum/spelta</i>	Spelt/Emmer spikelet fork		-	-	-	-	1	-	-
<i>Triticum spelta</i> L.	Spelt glume base		1	-	-	-	-	-	-
<i>Triticum dicoccum</i> Schübl	Emmer glume base		-	-	-	-	1	-	-
<i>Triticum</i> cf. <i>dicoccum</i> Schübl	Emmer spikelet fork		-	-	-	-	1	-	-
Other edible plants									
<i>Corylus avellana</i> L.	Hazel-nut shell fragment		-	-	-	1	-	-	-
<i>Vicia/Pisum</i> sp.	Bean/Pea		-	1	-	-	-	-	-
<i>Rubus</i> sect. <i>Glandulosus</i> Wimm. & Grab	Blackberry/Bramble		1	-	-	-	-	-	-
<i>Rubus</i> sp.	Blackberry/Raspberry		-	-	-	-	-	1	-
cf. <i>Rubus</i> sp.	Blackberry/Raspberry		-	-	-	-	3	-	-
<i>Sambucus nigra</i> L. (not charred)	Elder		-	-	-	3	-	-	-
Herbaceous weeds (seeds)									
cf. <i>Ranunculus</i> sp.	Buttercup		-	-	-	-	2	-	-
<i>Chenopodium</i> cf. <i>album</i> L.	Fat hen		-	-	-	1	-	-	-
<i>Chenopodium</i> sp.	Fat hen		2	-	-	-	-	-	-
<i>Atriplex</i> sp.	Oraches		-	-	1	-	-	-	-
Chenopodiaceae indet.	Goosefoot family		-	-	1	3	-	-	-

		Sample	4783	4295	4309	4342	4613	4662	4636
		Context	1216	2450	2543	2498	823	924	876
<i>Fallopia convolvulus</i> (L.) Á. Löve	Black bindweed		-	-	-	-	1	-	-
<i>Polygonum aviculare</i> L.	Knotgrass		1	-	-	-	-	-	-
<i>Persicaria lapathifolia</i> (L.) Gray	Pale persicaria		-	-	-	-	1	-	-
<i>Rumex</i> sp.	Docks		2	-	-	2	-	-	-
cf. Polygonaceae indet.	Knotweed family, internal cotyledon		-	-	-	1	-	-	-
<i>Malva</i> sp.	Mallow		1	-	-	-	-	-	-
<i>Urtica dioica</i> L.	Stinging nettle		-	-	-	1	-	-	-
<i>Odontites/Euphrasia</i> sp.	Bartsia/Eyebright		-	-	-	1	-	-	-
cf. <i>Potentilla</i> sp.	Cinquefoil		1	-	-	-	-	-	-
<i>Vicia/Lathyrus</i> sp.	Vetches/vetchlings/tares medium seeded		-	-	2	-	-	-	-
<i>Vicia/Lathyrus</i> sp.	Vetches/vetchlings/tares small seeded		-	-	-	-	-	1	-
<i>Vicia/Lathyrus</i> sp. (germinated)	Vetches/vetchlings/tares		1	-	-	-	-	-	-
Fabaceae indet.	Pea family, small seeded		1	-	1	-	-	-	-
<i>Lotus/Trifolium</i> type	Trefoils/clovers		-	-	-	3	-	-	-
<i>Plantago lanceolata/media</i> L.	Plantain		1	-	-	-	-	-	-
<i>Juncus</i> sp. capsule (<i>J. inflexus</i> type)	Rushes		-	-	-	1	-	-	-
<i>Juncus</i> sp. seed	Rushes		-	-	-	1	-	-	-
<i>Lemna</i> sp. (not charred)	Duckweed		-	-	-	-	-	-	-
<i>Eleocharis palustris</i> (L.) Roem. & Schult.	Common spike-rush		6	-	-	1	-	-	-
<i>Carex</i> sp.	Sedges 2 sided		5	-	-	1	-	-	-
<i>Carex</i> sp.	Sedges 3 sided		1	-	-	-	-	-	-
Cyperaceae indet.	Sedge family		2	-	-	-	-	-	-
<i>Bromus</i> sp.	Brome grass		1	-	-	2	-	-	-
cf. <i>Danthonia</i> sp.	Heath-grass		-	-	-	1	-	-	-
Poaceae	Grass, small seeded		5	-	3	1	2	-	-
Poaceae,	Grass, intermediate seeded		-	-	-	-	-	-	-
Indeterminate (mineralised)			-	-	2	-	-	-	-
Indet seeds			-	2	4	3	-	-	1
Other plant parts									
Rosaceae thorns			-	-	-	-	+	-	-
Thorns, indet			-	-	-	1	+	-	-
<i>Cenococcum geophilum</i> Fr.			-	-	++	-	+	-	-
Twig, indet			-	-	-	-	2	-	-
Modern seeds			+	-	-	-	-	-	-
Non-plant remains									
Mineralised worm capsule			-	-	1	-	-	-	-
? Charred worm capsule			-	-	-	-	-	-	1
Eggshell?			+	-	-	-	-	-	-
Fibre/Bristles			+	-	-	-	-	-	-
Droppings (small, mouse like)			+	-	-	-	-	-	-

	Sample	4783	4295	4309	4342	4613	4662	4636
	Context	1216	2450	2543	2498	823	924	876
Mussel shell fibre		-	-	-	+	-	-	-
Indet vitreous mass		-	-	-	1	-	-	-
Total items		30	2	15	25	8	1	2

Key

^a very narrow grain^b mineralised^c variously mineralised

+ = present ++ = common; +++ = abundant

Late and early post-Roman samples

		Sample	4640	4641	4357	4137	4109	4285	4307
		Context	895	897	2457	369	459	2484	2562
		Phase	9	9	10?	11b	11b	11b	11b
	Context type		pit	pit	layer	robber trench		robber trench	robber trench
Taxa	Common name								
Cereal Grain									
<i>Hordeum vulgare</i> L.	Barley, hulled		-	1	-	1	-	2	-
<i>Hordeum vulgare</i> L.	Barley, hulled, germinated		-	-	-	-	5	-	-
<i>Hordeum vulgare</i> L.	Barley		-	1	-	3	-	1	6
cf. <i>Hordeum vulgare</i> L.	Barley		-	-	1	-	3	-	3
<i>Triticum</i> cf. <i>spelta</i> L.	cf Spelt wheat, grain		-	-	-	-	-	1	-
<i>Triticum</i> cf. <i>dicoccum</i> Schübl	cf Emmer wheat grain		-	-	-	-	-	1	-
cf. <i>Triticum dicoccum/spelta</i>	Spelt/Emmer		-	-	1 ^a	-	-	-	-
<i>Triticum</i> sp. free threshing type	Wheat, free-threshing		-	-	4	3	1	1	11
<i>Triticum</i> sp.	Wheat, indeterminate		4	-	2	10	-	-	2
cf. <i>Triticum</i> sp.	cf Wheat		-	-	-	-	-	1	-
<i>Secale cereale</i> L.	Rye		-	-	-	-	-	7	2
cf. <i>Secale cereale</i> L.	Rye		-	-	-	-	-	1	2
<i>Triticum</i> sp./ <i>Secale cerealia</i> L.	Wheat/Rye		-	-	-	-	-	1	-
Cerealia indet	Indeterminate grain		-	-	9	53	5	8	9
Cereal Chaff									
<i>Triticum dicoccum/spelta</i>	Spelt/Emmer glume base		-	-	-	-	-	1	-
Other edible plants									
<i>Brassica</i> cf. <i>nigra</i> (L.) W.D.J. Koch	Black mustard		-	-	-	-	-	-	1
<i>Ficus carica</i> L. (charred)	Fig		6	-	-	-	-	-	-
<i>Ficus carica</i> L. (mineralised/not charred)	Fig		150+	8	12	-	-	-	-

		Sample	4640	4641	4357	4137	4109	4285	4307
		Context	895	897	2457	369	459	2484	2562
<i>Ficus carica</i> L. (not charred, fragments)	Fig		++	-	-	-	-	-	-
<i>Vicia faba</i> L.	Broad/Celtic bean		-	-	-	-	-	1	-
<i>Vicia/Pisum</i> sp.	Bean/Pea		-	-	-	-	-	1	-
<i>Rubus</i> sect. <i>glandulosus</i> Wimm. & Grab	Blackberry/Bramble		12	223	-	-	-	-	-
<i>Sambucus nigra</i> L.	Elder		-	-	-	-	-	-	1
<i>Sambucus nigra</i> L. (not charred)	Elder		11 ^b	16 ^c	9	3	-	1	-
Indet cf. fruit stone frag, min/woody			-	1	-	-	-	-	-
Herbaceous weeds (seeds)									
cf. <i>Ranunculus</i> sp.	Buttercup		-	-	-	-	2	1	-
<i>Chenopodium</i> cf. <i>album</i> L.	Fat hen		-	1	-	-	-	2	1
Chenopodiaceae indet.	Goosefoot family		-	-	-	-	-	2	3
<i>Stellaria media</i> group	Chickweed		-	-	-	-	-	-	3
<i>Montia fontana</i> subsp. <i>chondropserma</i> (Fenzl) Walters	Blinks		-	-	-	-	1	-	-
<i>Rumex</i> sp.	Docks		-	-	-	1	2	1	3
cf. <i>Malva</i> sp.	Mallow		-	1	-	-	-	-	-
<i>Viola</i> subgen <i>Viola</i>	Sweat/Hairy violet		-	2	-	-	-	-	-
cf. <i>Fragaria vesca</i>	Wild strawberry		-	-	1	-	-	-	-
<i>Vicia/Lathyrus</i> sp.	Vetches/vetchlings/tares medium seeded		-	-	2	-	-	-	-
<i>Vicia/Lathyrus</i> sp.	Vetches/vetchlings/tares small seeded		-	-	-	-	-	2	-
Fabaceae indet.	Pea family, small seeded		-	-	1	-	7	-	-
<i>Lotus/Trifolium</i> type	Trefoils/clovers		-	-	-	1	-	-	-
<i>Anthemis cotula</i> L.	Stinking chamomile		-	-	4	-	-	1	-
<i>Chrysanthemum segetum</i> L.	Corn marigold		-	-	-	-	-	-	4
Asteraceae	Daisy family, indeterminate		-	-	-	-	-	1	-
<i>Lemna</i> sp. (not charred)	Duckweed		1	-	-	-	-	-	-
<i>Eleocharis palustris</i> (L.) Roem. & Schult.	Common spike-rush		-	-	1	-	2	-	-
<i>Carex</i> sp.	Sedges 2 sided		1	-	-	-	-	-	1
<i>Carex</i> sp.	Sedges 3 sided		1	-	-	-	-	-	-
<i>Carex</i> sp. (mineralised/woody)	Sedges 3 sided		2	-	-	-	-	1	-
<i>Carex</i> sp. (not charred)	Sedges 3 sided		1	-	-	-	-	-	-
<i>Bromus</i> sp.	Brome grass		-	-	-	-	-	1	-
<i>Avena</i> sp. (grain)	Oat		2	1	1	40	3	14	25
Poaceae, small seeded	Grass, small seeded		-	-	-	1	8	1	2
Poaceae, intermediate	Grass, intermediate seeded		-	-	-	-	4	-	-
Poaceae, large seeded	Grass, large seeded		1	1	-	18	-	-	6
Indeterminate (mineralised)			-	1	-	-	-	-	-
Indet seeds			1	2	1	1	6	5	9

	Sample	4640	4641	4357	4137	4109	4285	4307
	Context	895	897	2457	369	459	2484	2562
Other plant parts								
Cereal sized basal culm node		-	-	-	1	-	-	-
Indet stem/culm frags (mineralised)		+	-	-	-	-	-	-
Mineralised wood fragments		+	-	-	-	-	-	-
Non-plant remains								
Mineralised fragments/flakes		++	++	-	-	-	-	-
Mineralised fly pupae		+	+++	-	-	3	-	-
Mineralised insect fragments		+	++	-	-	-	-	-
Fish bone		++	-	-	-	-	-	-
Small animal bones		+	-	-	-	-	-	-
Animal bone fragments/small bones		+	+ min?	-	-	-	-	-
Total items		10	9	11	63	38	32	58

Key

^a very narrow grain^b mineralised^c variously mineralised

+ = present ++ = common; +++ = abundant

APPENDIX 7

Faunal remains: metrics by species

Table 7.1 Cattle metrics in mm (* indicates approximate measurement).

Phalanx 1															
area	phase	context	sample	Bp	Glpe	SD	Bd								
A	5	625	4685	23.6	49.7	20.2	20.6	B	6	2500	na	26.6	48.7	21.3	25.9
A	5	1064	na	23.6	48.6	18.8	22.0	B	6	2543	na	27.3	52.3	22.6	25.4
A	5	625	4698	23.9	52.7	20.9	23.5	B	6	2500	na	27.6	50.7	24.0	24.5
A	5	1216	na	24.3	45.0	19.4	22.5	B	6	2542	na	27.8	59.1	22.7	26.5
A	5	625	na	24.4	51.6	22.0	25.4	B	6	2612	4381	27.8	53.4	23.3	26.4
A	5	1216	na	25.0	51.2	19.7	21.2	B	6	2543	4328	28.9	na	25.4	28.9
A	5	1126	na	25.2	51.1	21.7	23.1	B	6	2543	na	29.6	54.8	24.1	27.8
A	5	625	4708	25.8	48.0	21.9	25.2	B	6	2543	4328	29.6	na	24.6	27.6
A	5	1216	na	26.5	51.9	22.4	25.2	B	6	2543	4335	34.3	59.2	27.8	31.2 exostosis
A	5	1126	na	27.0	51.6	22.4	25.1	B	6	2543	4324	34.4	53.5	27.1	29.7
A	5	1075	4725	28.0	52.6	22.3	23.8	B	6	2500	na	56.2	56.2	23.9	30.2 exostosis
A	5	1216	na	na	52.9	20.7	23.0	B	6	2498	na	na	na	na	29.4
A	6	793	na	23.6	51.5	20.1	23.1*	Phalanx 2							
A	6	1214	na	23.9	54.5	20.5	23.5	area	phase	context	sample	Bp	Glpe	SD	Bd
A	6	934	4658	24.4	55.9	21.9	24.5	A	5	625	4688	19.6	na	16.2	17.7
A	6	556	na	26.6	57.1	24.1	25.9	A	5	1202	na	23.7	na	na	na
A	7	1100	4738	23.6	52.0*	19.4	22.0	A	5	625	4689	24.8	na	20.0	20.7
A	7	888	4638	24.4	na	na	na	A	5	625	na	25.7	32.9	19.2	21.1
A	7	134	4014	24.6	50.0	20.5	21.9	A	5	625	4711	26.3	33.2	20.7	22.9
A	7	791	4194	25.0	50.6	20.4	23.3	A	5	1152	4773	27.2	36.7	20.9	na
A	7	126	na	28.1	53.3	23.9	26.0	A	7	126	na	24.4	32.4	18.3	18.7
A	9	1004	na	24.9	54.0*	20.7	23.0*	A	7	722	na	24.8	36.2	19.0	20.4
B	6	2543	4338	22.4	54.4	19.2	21.8	A	7	555	na	25.3	na	19.1	21.3
B	6	2498	4380	23.5	50.3	19.4	21.4	A	7	126	na	25.3	33.5	20.4	21.2
B	6	2543	na	23.9	52.5	21.1	23.8	A	7	557	na	26.8	na	20.3	23.1
B	6	2612	4381	23.9	49.2	18.3	21.0	A	8	687	na	25.6	34.1	18.3	18.8*
B	6	2500	na	24.5	53.6	19.5	23.5	A	8	698	na	27.5	35.8	20.6	na
B	6	2543	4327	25.3	51.7	20.6	23.0	A	9	1004	na	30.6	37.0	23.8	24.3*
B	6	2500	na	25.4	49.4	21.5	25.4	B	6	2543	4327	23.6	33.4	17.5	18.0
B	6	2612	na	25.5	57.7	19.3	23.6	B	6	2543	4334	24.1	35.1	18.7	20.9
B	6	2543	na	25.7	54.1	21.0	25.4	B	6	2500	na	24.5	33.0	18.5	20.3
B	6	2513	4382	25.9	49.0	21.6	24.6	B	6	2500	na	24.6	31.5	18.9	19.9
B	6	2612	4381	26.0	50.9	20.4	23.5	B	6	2543	4312	24.9	32.6	18.9	21.2
B	6	2498	na	26.2	57.4	22.0	25.4	B	6	2500	na	25.6	33.8	19.4	19.5
B	6	2513	4382	26.3	49.6	21.1	23.9	B	6	2612	4381	26.2	34.6	19.7	21.0
B	6	2513	4382	26.6	50.1	22.1	24.3								

B	6	2500	na	26.6	32.9	21.0	21.1
B	6	2498	4380	26.7	36.7	21.2	na
B	6	2498	4365	26.7	36.4	20.6	21.7
B	6	2543	4335	26.8	34.7	20.5	23.0
B	6	2543	4328	26.9	35.6	19.5	22.2
B	6	2543	4328	26.9	35.5	20.7	22.5
B	6	2500	na	26.9	36.7	21.2	21.1*
B	6	2500	na	27.0	34.0	21.2	23.5
B	6	2612	4381	27.2	34.4	21.0	23.2
B	6	2543	na	27.5	39.5	21.0	22.4
B	6	2612	4381	28.1	37.0	22.3	22.2
B	6	2543	4321	28.2	38.9	21.2	23.9
B	6	2612	4381	29.7	37.2	23.0	na
B	6	2543	4332	25.2*	na	17.9	19.2*

Phalanx 3

area	phase	context	sample	DLS	MBS	Ld	Notes
A	3	1091	4730	78.3	23.5	55.6	
A	5	1152	4773	60.9	18.4	45.0	
A	5	1075	4724	71.6	20.3	52.2	
A	5	1064	na	59.5	18.3	44.9	
A	5	625	4711	63.1	18.9	46.5	
A	5	625	4694	58.8	18.8	44.9	
A	7	838	na	79.0	22.9	57.3	
A	7	753	na	66.9	18.5	52.0	
A	7	717	na	50.0	15.9	41.9	
A	7	135	4015	66.0	19.0	45.2	
B	6	2612	4381	63.2	20.2	46.3	
B	6	2612	4381	65.4	18.4	49.0	
B	6	2612	4381	68.0	21.2	47.0	
B	6	2612	4381	50*	16.3	37.3	
B	6	2612	4371	55.4	18.0	44.6*	
B	6	2612	na	81.6*	25.0	61.3*	
B	6	2543	4336	67.5	21.1	49.5	
B	6	2543	4334	79.6	25.3	55.7	
B	6	2543	4330	74.5	23.6	54.0	
B	6	2543	4330	58.3	18.7	44.5	
B	6	2543	4328	48.0	15.0	39.3	juvenile?

B	6	2543	4324	61.8	17.9	48.7
B	6	2543	4321	59.3	18.6	43.6
B	6	2543	4321	50.5	14.6	41.1
B	6	2543	4319	67.3	22.2	52.9
B	6	2543	4309	47.1	12.1	35.4
B	6	2543	na	69.6	22.8	48.4
B	6	2513	4382	63.3	20.3	50.0
B	6	2500	na	51.6	16.0	41.7
B	6	2500	na	50.8	15.9	41.6
B	6	2498	4380	55.4	17.0	43.5
B	6	2498	4380	68.8*	19.6	49.9
B	6	2498	4380	na	17.7	na

Astragalus

area	phase	context	sample	GLI	GLm	Dm	DI	Bd
A	5	1126	na	56.7	52.7	30.7	31.2	33.4
A	5	625	4691	54.6	50.8	na	na	34.8
A	5	1152	4773	59.2	52.5*	32.2	33.0	37.7*
A	5	625	4715	na	50.1	na	na	na
A	6	708	na	na	52.5	na	na	na
B	6	2543	4325	60.0	54.4	31.8*	32.3	36.6
B	6	2500	na	57.3	51.1	31.3	30.8	38.2
B	6	2500	na	60.6	55.1	na	33.6	38.8
B	6	2612	4381	na	61.9	36.2*	na	na
B	6	2498	4380	na	n	35.9	35.8	na

Calcaneus

area	phase	context	sample	GL	GB
A	6	625	4704	110.5	na
B	6	2498	na	113.8	38.6

Humerus

area	phase	context	sample	BT	HTC
A	4	1259	na	64.6	27.8
B	6	2461	na	60.8	28.8
B	6	2543	4331	63.2*	na

Metacarpal

area	phase	context	sample	Bp	BFp	DFp	GL	SD	Bd	BFd	Bfus	BFdm Davis 19/92	BFdl	Davis 1MP	2MP	Davis 3MP	4MP	5MP	6MP
A	5	625	na	47.5	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
A	5	625	4709	50.1	48.6	30.7	na	na	na	na	na	na	na	na	na	na	na	na	na
A	7	952	4654	49.1	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
B	6	2612	na	47.3	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
B	6	2500	na	na	na	na	161.0	29.8	na	53.0	49.7	24.9	25.0	21.3	28.4	25.4	20.3	27.6	25.6
B	6	2543	4333	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
B	6	2499	na	na	na	na	na	28.4	51.9	51.9	47.7	25.3	24.1	23.1	30.0*	26.5	21.3	28.6	26.6
B	6	2513	4382	na	na	na	na	na	49.3	49.3	44.7	23.4	23.0	21.6	28.1	25.1	20.7	27.0	25.0
B	6	2513	4382	na	na	na	na	na	55.7	55.7	50.4	27.1	26.6	24.2	31.4	27.5	22.6	30.8	28.0

Metatarsal

area	phase	context	sample	Bp	GL	SD	Bd	DD	BFd	Bfus	BFdm Davis 19/92	BFdl	Davis 1MP	2MP	Davis 3MP	4MP	5MP	6MP
A	4	1086	4729	39.7	na	na	na	na	na	na	na	na	na	na	na	na	na	na
A	4	1086	na	na	na	23.0*	na	na	44.3	40.8	21.2	20.2	20.6	27.5	23.9	19.2	26.7	24.3
A	5	1216	na	na	na	na	na	na	na	na	22.4	na	19.1	na	23.2	na	na	na
A	7	716	na	39.7	na	na	na	na	na	na	na	na	na	na	na	na	na	na
A	7	963	na	na	na	na	46.6	na	46.4	42.6	na	na	na	na	na	na	na	na
A	6	2500	na	39.7	na	na	na	na	na	na	na	na	na	na	na	na	na	na
B	6	2543	4337	40.4	na	na	na	na	na	na	na	na	na	na	na	na	na	na
B	6	2500	na	40.8	185.5	24.3	na	na	49.5	49.3	24.6	22.2	20.0	26.5	23.4	18.2	25.8	24.1
B	6	2543	4331	na	na	na	43.0	19.6	43.0	na	20.8	19.4	20.1	26.6	23.2	18.8	25.7	23.7
B	6	2612	4381	na	na	na	44.7	na	44.7	42.2	na	na	20.1	na	na	18.5	na	24.0
B	6	2498	4380	na	na	na	46.3	na	46.3	43.8	21.4	21.0	19.7	27.2	24.2	19.3	26.3	24.8
B	6	2543	4328	na	na	na	48.3	na	48.3	na	23.5	22.4	23.0	29.9	26.4	21.0	28.8	26.9
B	6	2612	4381	na	na	na	56.8	na	56.8	51.1	27.6	25.3	23.4	31.3	27.6	22.2	na	27.8

Radius

area	phase	context	sample	BP	BFp	SD
area	6	708	na	65.2	61.2	32.2

Scapula

area	phase	context	sample	GLP	SLC	LG
area	5	1202	na	58.8*	na	48.1*
B	6	2612	4381	na	47.9	na

Tibia

area	phase	context	sample	Bd
B	6	2500	na	55.4*

Ulna

area	phase	context	sample	SDO
B	6	2498	4368	43.5

Table 7.2 Sheep metrics in mm (* indicates approximate measurement; ^ indicates sheep/goat).**Phalanx 1**

area	phase	context	sample	Bp	Glpe	SD	Bd
A	5	625	4683	9.4	29.1	6.8	8.7
A	5	625	4697	11.6	33.6	9.2	10.5
A	6	923	4670	11.5	31.3	9.5	11.1
A	6	585	na	11.0*	na	8.8	10.2*
A^	7	126	4016	12.8*	42.8	10.7	13.1
A	7	673	na	10.5	31.2	9.1	10.0*
A	7	126	4016	10.9	31.7	9.3	10.8
A	7	716	na	11.7	32.5	9.5	10.9
B	6	2543	4347	12.7	35.4	10.3	11.0
B	6	2543	4338	10.3	28.9*	8.3	na

Phalanx 2

area	phase	context	sample	Bp	Glpe	SD	Bd
A	5	1075	4719	8.9	18.3	6.6	7.3
A	5	625	4697	9.9	19.7	6.8	na
A	5	1075	4719	9.9	19.7	6.9	7.4
A	5	625	4715	10.1	na	6.8	7.8
A	5	625	4689	11.2	na	8.4	9.5
B	6	2612	4381	9.7	19.9	6.9	7.5
B	6	2543	4337	10.2	21.1	7.3	8.4
B	6	2513	4382	12.9	na	9.1	na

Phalanx 3

area	phase	context	sample	DLS	MBS	Ld	Notes
A	5	625	4711	na	5.9	na	
B	6	2612	4371	23.0	5.4	18.2	
B	6	2543	4330	na	5.9	na	
B	6	2543	4329	15.7*	3.6	na	lamb
B	6	2543	4327	25.3*	5.9	17.4*	
B	6	2498	4380	17.8	4.0	14.1	

Astragalus

area	phase	context	sample	GLI	GLm	Dm	DI	Bd
A	5	1152	4773	25.0	25.0	na	8.6	10.9
A	5	625	4709	24.6	23.7	na	na	na
B^	6	2612	4381	na	23.3	na	na	na
B	6	2513	4377	24.4	23.7	14.7	13.9	16.1
B	6	2450	na	24.9	24.8	na	14.4	16.5

Atlas

area	phase	context	sample	GL	GB	BFcr	BFcd
A	5	625	4714	39.3	53.7*	42.6	40.7

Calcaneus

area	phase	context	sample	GL	C	C+D	Notes
A	7	1100	4738	na	11.3	19.6	Unfused
A	7	745	na	na	13.0	11.5	Unfused
B	6	2498	na	47.5	11.3	18.4*	

Femur

area	phase	context	sample	BP	DC
area	5	625	4694	38.7	17.5

Humerus

area	phase	context	sample	SD	Bd	BT	HTC
A	7	555	na	11.5	25.5	23.9	12.5
B	6	2543	na	na	26.4	24.9	12.6

Metacarpal

area	phase	context	sample	Bp	GL	SD	Bd	BFd	Bfus	BFdm Davis 19/92	BFdl	Davis 1MP	2MP	Davis 3MP	4MP	5MP	6MP
B	6	2513	4382	19.1	113.8	12.0	23.0	23.0	22.2	10.6	10.4	9.7	14.2	12.0	9.1	13.8*	12.1
B	6	2498	na	20.6	121.0	11.8	22.2	22.0	22.2	10.6	9.9	10.0	14.4	12.6	9.0	14.1	12.2

Metatarsal

area	phase	context	sample	Bp	GL	SD	Bd	BFd	Bfus	BFdm Davis 19/92	BFdl	Davis 1MP	2MP	Davis 3MP	4MP	5MP	6MP
A^	5	1216	na	18.51	na	na	na	na	na	na	na	na	na	na	na	na	na
A	5	625	4690	na	na	na	21.11	na	na	na	na	na	na	na	na	na	na
A^	9	1028	na	18.96	na	na	na	na	na	na	na	na	na	na	na	na	na
A^	9	852	na	na	na	8.01	na	na	na	na	na	na	na	na	na	na	na
B^	6	2612	na	17.78	na	na	na	na	na	na	na	na	na	na	na	na	na
B	6	2498	na	17.68	121.07	9.05	20.73	20.56	20.02	9.75	9.02	8.65	13.79	11.64	8.3*	13.2*	11.7
B	6	2513	4382	18.8	131.81	10.41	22.2*	22.2*	21.47	10.53	9.6*	9.79	15.61	13.05	9.2	14.66	13.21

Pelvis

area	phase	context	sample	LA	LAR	SH	SB	LFo	LS
A^	3	1091	na	26.9	23.6	na	8.7	30.2	41.6
A^	7	899	na	na	na	12.6	9.4	na	na
A^	7	673	na	26.1*	21.1*	11.9	9.3	na	na

Radius

area	phase	context	sample	BP	BFp	SD	Bd	BFd
A^	9	852	na	na	na	10.2	na	na
A	5	1133	na	27.5	26.2	na	na	na
A	5	625	4694	28.6	26.9	na	na	na
A	5	625	4683	na	na	na	24.0	20.5
A	7	132	4012	26.4	24.6	na	na	na
A	7	1100	4738	28.3	25.5	na	na	na
B	6	2612	4345	26.4	24.7	na	na	na
B	6	2507	na	na	na	na	25.8	22.3

Scapula

area	phase	context	sample	GLP	SLC	ASG	BG	LG
A^	5	1126	4752	na	na	na	19.0	24.0
A	7	673	na	30.0	17.5	18.3	na	na
B	6	2543	4312	na	18.3	na	na	na

Tibia

area	phase	context	sample	SD	Bd	Dd
A	5	625	4693	12.4	23.7	na
A	5	625	4702	na	23.2	18.0
A	5	1202	4779	na	23.4	19.0
A	7	557	na	na	22.5	17.3
A	7	963	na	na	24.0	19.0
B	6	2513	4344	na	24.7	18.5

Ulna

area	phase	context	sample	LO	SDO
B	6	2543	4328	38.5	19.2

Table 7.3 Goat metrics in mm (* indicates approximate measurement).

Phalanx 1

area	phase	context	sample	Bp	Glpe	SD	Bd
A	9	897	na	12.6	38.1	11.2	12.9*
A	9	897	na	13.0	38.4	10.9	12.8

Phalanx 2

area	phase	context	sample	Bp	Glpe	SD	Bd
A	5	625	4710	14.5	na	11.4	12.2
B	6	2543	4315	15.8	26.7	11.7	13.8
B	6	2543	4319	16.6	25.2	12.4	14.4

Metacarpal

area	phase	context	sample	Bd	BFd	Notes
A	5	625	4691	34.2	31.0	Immature and very large

Radius

area	phase	context	sample	Bp	BFp
A	5	625	4709	30.4*	29.4*

Table 7.4 Pig metrics in mm (* indicates approximate measurement).**Phalanx 1**

area	phase	context	sample	Bp	Glpe	SD	Bd
A	5	625	na	15.2	32.8	13.2	14.8
A	7	865	4633	14.3	31.2	12.2	13.8
B	6	2498	4380	14.8	34.6	12.1	14.0
B	6	2513	4382	15.2	31.0	12.3	14.1
B	6	2543	4325	15.3	36.0	12.1	14.1
B	6	2543	4335	15.6	32.2	12.2	14.0

Phalanx 2

area	phase	context	sample	Bp	Glpe	SD	Bd
A	5	1152	4773	15.1	19.8	12.8	14.1
A	5	625	4705	na	20.2	na	na
A	7	555	na	14.2	23.5	na	11.9*
A	7	131	4011	14.4	22.0	12.1	12.7
A	7	894	na	14.9	20.5	11.8	13.0
B	6	2498	4380	13.4	22.3	10.7	11.2
B	6	2543	4336	14.1	19.1	11.7	13.0
B	6	2612	4381	14.2	19.1	11.6	12.6
B	6	2543	4309	14.3	22.3	12.0	11.9
B	6	2543	4347	14.6	19.5	12.4	13.2
B	66	2513	4382	14.7	20.4	12.2	12.9
B	6	2513	4382	14.8	19.5	12.1	12.8
B	6	2543	4329	15.3	na	12.2	12.7
B	6	2513	4382	15.6	21.0	12.5	14.1
B	6	2612	4381	16.2	22.1	13.6*	13.8

Phalanx 3

area	phase	context	sample	DLS	MBS	Ld
A	5	1216	4783	30.8	11.7	27.8
A	5	1216	na	30.0	10.6	26.9
A	5	1202	4779	23.9	9.5	21.7
A	5	1075	4719	26.1	10.7	23.4
A	5	625	4715	27.4	10.3	25.3
A	5	625	4694	28.1	10.7	26.0
B	6	2612	4372	22.1	7.9	20.2
B	6	2543	4347	27.9	11.0	25.6
B	6	2543	4347	29.0	10.9	na
B	6	2543	4335	24.9	9.6	22.4*
B	6	2543	4331	27.1	9.2	25.5
B	6	2543	4328	24.8	10.1	23.0
B	6	2543	4324	26.5	9.7	25.6
B	6	2543	4320	24.8	10.3	22.6
B	6	2513	4382	27.1	10.8	25.4
B	6	2498	4380	27.1	10.6	24.3
B	6	2498	4380	24.5	8.9	21.4*

B	6	2461	4305	22.7*	8.7*	19.7*
B	6	2450	4295	25.0	8.3	23.0

Astragalus

area	phase	context	sample	GLI	GLm
A	5	1216	na	41.3	37.5
A	5	1152	4770	40.7	na
A	5	625	4694	41.5	37.7

Humerus

area	phase	context	sample	Bd	BT
A	4	1086	na	na	na
A	5	1216	na	37.3	na
A	6	556	na	39.1*	na
A	7	745	na	37.1	28.4*

Metacarpal 3

area	phase	context	sample	Bp	Notes
B	6	2612	4381	13.8	Unfused

Metacarpal 4

area	phase	context	sample	GL	Notes
B	6	2612	4381	28.2*	Unfused

Metatarsal 3

area	phase	context	sample	Bp	
A	5	625	4692	12.8	
A	7	963	na	13.0*	
B	6	2612	4381	13.6	
B	6	2513	4382	13.8	HTC 18.8

Metatarsal 4

area	phase	context	sample	Bp	na
area	5	1246	4790	17.6	18.3
B	6	2612	4381	14.3	

18.3*

Pelvis

area	phase	context	sample	LA	LAR	SH	SB
A	5	625	4700	35.3	32.6	25.0	14.1
A	5	625	na	31.5	29.3	na	na
B	6	2543	4328	34.3	28.9	na	11.8

Radius

area	phase	context	sample	Bp	BFp	SD	Note
A	5	625	4707	27.8	na	17.6*	
A	5	625	4710	na	na	7.3*	
B	6	2612	4369	26.7	na	na	

B	6	2513	4382	27.3	na	na	
B	6	2612	4381	40.2	40.2	na	
B	6	2612	4381	41.0	41.0	30.5	
B	6	2612	4381	43.6	43.6	na	
B	6	2543	4335	na	na	2.9*	Neonate

Scapula

area	phase	context	sample	GLP	SLC	BG
A	6	989	4671	31.2*	na	22.6*
A	7	131	4011	30.0*	na	na
B	6	2612	4381	34.0	22.9	na
B	6	2612	4381	35.0	25.0	27.1
B	6	2612	4381	31.8*	20.5	na

Tibia

area	phase	context	sample	Bp
B	6	2543	4321	44.5

Mandible

area	phase	context	sample	M3 B	M3 L	8	9a	11	12	16b	16c	21
A	5	625	na	na	na	na	na	na	na	35.3*	na	na
A	5	1216	na	13.3	29.5	na	na	na	na	na	na	na
A	7	126	na	na	na	na	38.3	40.0	63.0*	34.3	37.6	13.3
A	7	126	na	14.1*	28.8*	62.8*	na	na	na	na	na	na

Table 7.5 Red deer metrics in mm (* indicates approximate measurement).

Phalanx 2

area	phase	context	sample	Bp	SD	Bd
A	5	1216	na	20.1	14.5	15.8

Astragalus

area	phase	context	sample	GLm	Bd
A	5	1133	na	52.2*	32.0*

Humerus

area	phase	context	sample	Bd	BT	HTC
A	5	1133	na	60.5	53.5	29.4

Table 7.6 Roe deer metrics in mm.**Phalanx 3**

area	phase	context	sample	DLS	MBS	Ld
A	5	1202	4774	26.0	5.4	24.0

Metacarpal

area	phase	context	sample	Bp	Bd	BFd
A	5	1216	na	21.5	21.6	21.6

Table 7.7 Dog metrics in mm (* indicates approximate measurement).**Femur**

area	phase	context	sample	Bp	GLC	SD
A	5	1126	na	39.3	184.0*	13.6*
A	5	625	4688	na	na	9.0

Table 7.8 Hare metrics in mm.**Metatarsals (articulated)**

area	phase	context	sample	element	GL	Bd
A	5	1216	4784	2nd Metatarsa	54.3	7.0
A	5	1216	4784	3rd Metatarsal	56.7	6.9
A	5	1216	4784	4th Metatarsal	55.0	6.5
A	5	1216	4784	5th Metatarsal	48.9	5.7

Pelvis

area	phase	context	sample	LA	LAR	SH
B	6	2513	4382	13.6	11.8	11.5

Scapula

area	phase	context	sample	GLP	BG	LG
A	5	1216	4784	13.9	12.7	13.1

Table 7.9 Galliformes cf chicken and chicken, *Gallus gallus domesticus* measurements in mm (* indicates slight damage).

Carpometacarpus									
area	phase	context	sample	element	species	Bp	GL	Did	
A	5	625	4159	carpometacarpus	Galliforme cf chicken	10.0	na	na	
A	5	625	4709	carpometacarpus	Galliforme cf chicken	9.9	33.6	6.6	
A	5	625	4694	carpometacarpus	<i>Gallus gallus</i>	10.1	31.5	6.4	
A	7	555		carpometacarpus	Galliforme cf chicken	na	31.9	6.4	bantam sized
A	7	805	4201	carpometacarpus	Galliforme cf chicken	10.8	33.0	6.4	
A	7	875	4635	carpometacarpus	Galliforme cf chicken	na	na	7.1	
A	7	888	4638	carpometacarpus	Galliforme cf chicken	10.1	34.7	6.6	bantam sized
A	9	852		carpometacarpus	Galliforme cf chicken	12.0	35.8	7.0	bantam sized
A	11b	442		carpometacarpus	Galliforme cf chicken	10.8	33.4	6.7	
B	6	2498	4364	carpometacarpus	Galliforme cf chicken	12.0	36.7	6.5	
B	6	2543	4337	carpometacarpus	Galliforme cf chicken	11.9	na	na	
B	6	2612	4381	carpometacarpus	Galliforme cf chicken	na	32.3	6.0	
B	6	2612	4381	carpometacarpus	Galliforme cf chicken	na	na	7.8	
B	6	2498	4365	carpometacarpus	<i>Gallus gallus</i>	10.4	33.0	6.6	
B	6	2498	4380	carpometacarpus	<i>Gallus gallus</i>	11.8	39.7	7.5	

Coracoid									
area	phase	context	sample	element	species	Bf	GL	Lm	Bb
A	5	625	4684	coracoid	Galliformes cf chicken	9.9	na	na	na bantam sized
A	5	1216	4784	coracoid	<i>Gallus gallus domesticus</i>	9.5*	na	na	na
A	6	708		coracoid	Galliformes cf chicken	11.5	50.2	47.6	13.9 bantam sized
A	6	1214		coracoid	Galliformes cf chicken	12.1*	54.0*	51.8*	
A	6	555		coracoid	Galliformes cf chicken	10.6	45.6	43.0	13.0 bantam sized
A	7	716		coracoid	Galliformes cf chicken	9.5*	48.1*	46.0	12.9 bantam sized
A	7	755		coracoid	Galliformes cf chicken	11.1	48.9	47.0	12.9 bantam sized
A	7	755		coracoid	Galliformes cf chicken	8.9	47.1*	na	11.0 bantam sized
A	7	809	4604	coracoid	Galliformes cf chicken	11.1*	49.5	47.2*	bantam sized
A	9	892		coracoid	Galliformes cf chicken	10.6	48.5	45.7	12.5 bantam sized
A	11b	322		coracoid	Galliformes cf chicken	15.8	na	na	18.5
A	11b	604		coracoid	Galliformes cf chicken	na	46.2	na	na
B	6	2450	4295	coracoid	Galliformes cf chicken	15.3*	57.6	54.3*	19.9*
B	6	2513	4382	coracoid	Galliformes cf chicken	11.8*	58.0	56.0	15.0*
B	6	2542		coracoid	Galliformes cf chicken	11.3	49.2	46.5	13.8* bantam sized
B	6	2543	4331	coracoid	Galliformes cf chicken	13.3*	55.3	52.2	15.2*
B	6	2543	4334	coracoid	Galliformes cf chicken	12.8	58.7	56.1	15.7
B	6	2612	4381	coracoid	Galliformes cf chicken	10.3	52.7	50.4	
B	9	2458		coracoid	Galliformes cf chicken	10.1	49.1	47.1	12.1
B	9	2493		coracoid	Galliformes cf chicken	9.9*	48.2	45.9	na
B	9	2493		coracoid	Galliformes cf chicken	13.0	57.4	54.8	na
B	11	2560		coracoid	Galliformes cf chicken	11.2	48.5	46.2	12.9
B	11	2518		coracoid	<i>Gallus gallus domesticus</i>	na	58.2	55.2*	na

Femur

area	phase	context	sample	element	species	Bp	Dp	GL	SC	Lm	Bd	Dd	
A	6	736		femur	<i>Gallus gallus</i>	13.6	10.2	71.9	6.1	66.6	12.9	11.1	bantam sized
A	7	716		femur	<i>Gallus gallus</i>	14.6	10.9	75.1	6.3	70.0	14.8	12.1	bantam sized
A	7	716		femur	<i>Gallus gallus</i>	14.4	10.6	75.2	6.1	69.9*	14.0	na	bantam sized
A	7	875	4635	femur	<i>Gallus gallus</i>	13.1	na	72.0*	6.4	68.7	13.8	11.8	bantam sized
A	7	888	4638	femur	<i>Gallus gallus</i>	13.8	9.0	71.9	6.2	66.7*	13.2	11.1	bantam sized
A	9	895		femur	<i>Gallus gallus</i>	na	na	na	na	66.7*	13.8	12.1*	bantam sized
A	11b	411		femur	<i>Gallus gallus</i>	15.8	na	81.5*	na	na	15.2	na	
A	11b	411		femur	<i>Gallus gallus</i>	na	na	na	na	na	13.7	11.3	
A	11b	458		femur	<i>Gallus gallus</i>	na	na	73.5*	5.9	70.4	13.1*	na	
B	6	2543		femur	Galliforme cf chicken	na	na	84.1*	6.7	80.5	16.1	13.7*	bantam plus
B	6	2513	4382	femur	<i>Gallus gallus</i>	13.0*	9.7*	na	na	na	na	na	
B	6	2543	4313	femur	<i>Gallus gallus</i>	na	na	na	na	na	16.2	13.0	
B	11	2557		femur	Galliforme cf chicken	na	na	na	na	na	13.0	na	
B	11	2481		femur	<i>Gallus gallus</i>	14.4	na	na	na	na	na	na	

Humerus

area	phase	context	sample	element	species	Bp	GL	SC	Bd	
A	5	625	4689	humerus	<i>Gallus gallus</i>	19.4	71.8	7.3	15.5	
A	7	715		humerus	Galliforme cf chicken	na	na	na	13.9	bantam sized
A	7	716		humerus	Galliforme cf chicken	17.4	63.7	5.9	13.5	bantam sized
A	7	716		humerus	Galliforme cf chicken	na	na	na	13.0	bantam sized
A	7	738		humerus	Galliforme cf chicken	na	na	na	14.2	bantam sized
A	7	798	4602	humerus	Galliforme cf chicken	na	na	6.4	na	
A	7	899		humerus	<i>Gallus gallus</i>	na	6.5	na	na	
A	11a	315		humerus	Galliforme cf chicken	na	na	6.2	na	bantam sized
A	11b	584		humerus	Galliforme cf chicken	na	na	na	16.2	
A	11b	623		humerus	Galliforme cf chicken	na	na	7.2	16.3	
A	11b	623		humerus	Galliforme cf chicken	17.5	61.7	6.4	13.4	
A	11b	244		humerus	<i>Gallus gallus</i>	17.7	64.9	6.3	13.7	
A	11b	410		humerus	<i>Gallus gallus</i>	17.5	61.9	6.1	14.0	
B	6	2498	4380	humerus	Galliforme cf chicken	na	na	6.7	na	
B	6	2498	4380	humerus	Galliforme cf chicken	na	na	7.4	na	
B	6	2498	4367	humerus	<i>Gallus gallus</i>	19.0	68.4	6.9	14.6	
B	6	2543		humerus	<i>Gallus gallus</i>	20.1	na	na	na	
B	11	2570		humerus	Galliforme cf chicken	na	na	na	13.8	
B	11	2494		humerus	<i>Gallus gallus</i>	na	na	7.5	na	
B	11	2541		humerus	<i>Gallus gallus</i>	20.2	na	6.9	na	
B	11	2560		humerus	<i>Gallus gallus</i>	18.6	67.2	6.5	14.0	
B	11	2562		humerus	<i>Gallus gallus</i>	16.7	63.0*	6.1	13.2	
B	11	2578		humerus	<i>Gallus gallus</i>	18.0	na	6.6	na	
B	11	2583		humerus	<i>Gallus gallus</i>	19.7	72.2	6.6	14.9	

Pelvis

area	phase	context	sample	element	species	DiA
A	5	625	4706	pelvis	Galliforme cf chicken	8.5
A	6	319		pelvis	Galliforme cf chicken	8.5

A	7	716	4160	pelvis	Galliforme cf chicken	7.78
A	7	798		pelvis	Galliforme cf chicken	7.87
B	6	2543	4319	pelvis	Galliforme cf chicken	9.6

Radius

area	phase	context	sample	element	species	GL	SC	Bd
A	5	625	4684	radius	Galliforme cf chicken	64.9	3.5	7.3
A	7	126	4016	radius	Galliforme cf chicken	na	na	6.1
A	7	135	4015	radius	Galliforme cf chicken	63.3*	na	na Juvenile
A	7	135	4015	radius	Galliforme cf chicken	na	na	6.9
A	7	888	4638	radius	Galliforme cf chicken	55.2	2.5	6.4
A	11b	391		radius	Galliforme cf chicken	57.0	3.2	6.5
A	11b	619		radius	Galliforme cf chicken	58.5	3.1	6.7
A	11b	244		radius	<i>Gallus gallus</i>	54.9	na	6.5 bantam sized
B	6	2450	4295	radius	Galliforme cf chicken	66.9	3.5	7.7
B	6	2498	4364	radius	Galliforme cf chicken	na	na	6.8
B	6	2498	4365	radius	Galliforme cf chicken	na	na	6.2
B	6	2543	4309	radius	Galliforme cf chicken	61.9	3.0	6.8
B	6	2543	4309	radius	Galliforme cf chicken	na	na	6.8
B	6	2543	4335	radius	Galliforme cf chicken	na	na	7.1
B	6	2612	4381	radius	Galliforme cf chicken	58.3*	na	6.2
B	6	2612	4381	radius	Galliforme cf chicken	na	na	5.9

Scapula

area	phase	context	sample	element	species	Dic	GL
A	5	625	4698	scapula	Galliforme cf chicken	13.5	na
A	7	755		scapula	Galliforme cf chicken	10.9	na bantam sized
A	7	798		scapula	Galliforme cf chicken	11.0	na
A	11a	485		scapula	Galliforme cf chicken	11.3	na
A	11b	322		scapula	<i>Gallus gallus</i>	11.9	na
A	11b	322		scapula	<i>Gallus gallus</i>	10.8	na
B	6	2498	4364	scapula	Galliforme cf chicken	na	na
B	6	2513	4382	scapula	Galliforme cf chicken	13.4	na
B	6	2513	4382	scapula	Galliforme cf chicken	na	na
B	6	2513	4382	scapula	Galliforme cf chicken	na	na
B	6	2543	4311	scapula	Galliforme cf chicken	na	na
B	6	2543	4318	scapula	Galliforme cf chicken	na	na
B	6	2543	4322	scapula	Galliforme cf chicken	na	na
B	6	2543	4330	scapula	Galliforme cf chicken	13.5	na
B	6	2543	4334	scapula	Galliforme cf chicken	na	na
B	6	2543	4338	scapula	Galliforme cf chicken	11.4	na
B	11	2562		scapula	<i>Gallus gallus</i>	11.1	65.3

Tarsometatarsus

area	phase	context	sample	element	species	Bp	GL	SC	Bd
A	5	1202	4779	tarsometatarsus	Galliforme cf chicken	11.5	na	na	na

A	5	625	4715	tarsometatarsus	<i>Gallus gallus</i>	na	na	5.8	na	
A	7	132	4012	tarsometatarsus	Galliforme cf chicken	11.0	na	na	na	
A	7	722		tarsometatarsus	Galliforme cf chicken	11.2	na	na	na	bantam sized
A	7	791	4194	tarsometatarsus	<i>Gallus gallus</i>	10.8	65.4*	5.6	na	
A	7	798		tarsometatarsus	<i>Gallus gallus</i>	12.1	61.1	5.6	11.8	bantam sized
A	7	894		tarsometatarsus	<i>Gallus gallus</i>	na	na	6.2	11.8	bantam sized
										Female; no spur
A	11b	244		tarsometatarsus	Galliforme cf chicken	na	na	5.4	11.5	
A	11a	315		tarsometatarsus	<i>Gallus gallus</i>	na	na	5.2		
A	11b	411		tarsometatarsus	<i>Gallus gallus</i>	11.5	66.8	5.7	11.3	female
A	11b	411		tarsometatarsus	<i>Gallus gallus</i>	na	na	5.7	11.3	female
B	6	2543	4347	tarsometatarsus	Galliforme cf chicken	na	na	na	12.1	
B	6	2543	4347	tarsometatarsus	Galliforme cf chicken	14.0	na	na	na	
B	6	2543		tarsometatarsus	Galliforme cf chicken	11.4	na	na	na	
B	6	2498	4367	tarsometatarsus	<i>Gallus gallus</i>	na	na	na	13.5	
B	6	2513	4382	tarsometatarsus	<i>Gallus gallus</i>	na	na	5.9	na	
B	6	2543		tarsometatarsus	<i>Gallus gallus</i>	13.9	81.0	6.4	13.3	
B	6	2612	4371	tarsometatarsus	<i>Gallus gallus</i>	11.2	63.2	5.5	11.5	
B	6	2612	4381	tarsometatarsus	<i>Gallus gallus</i>	12.4	68.8*	na	12.5	
B	11	2541		tarsometatarsus	<i>Gallus gallus</i>	14.1	85.7	7.0	13.8	male

Tibiotarsus

area	phase	context	sample	element	species	Dip	GL	SC	La	Bd	Dd
A	5	625	4690	tibiotarsus	Galliforme cf chicken	na	na	na	na	9.8	bantam sized
A	5	625	4713	tibiotarsus	Galliforme cf chicken	na	na	na	na	10.2	10.1
A	5	1075	4725	tibiotarsus	Galliforme cf chicken	na	na	na	na	11.1	10.6
A	6	522		tibiotarsus	Galliforme cf chicken	na	na	na	na	12.4	12.6*
A	6	708		tibiotarsus	Galliforme cf chicken	na	na	na	na	11.6	12.1 bantam sized
A	6	736		tibiotarsus	<i>Gallus gallus</i>	18.4	98.2	5.9	95.1	9.8	10.3 bantam sized
A	7	888	4638	tibiotarsus	Galliforme cf chicken	na	na	na	na	10.0	
A	7	555		tibiotarsus	<i>Gallus gallus</i>	22.0	113.9	na	109.7	11.4	12.1*
A	7	707		tibiotarsus	<i>Gallus gallus</i>	18.3	95.0*	5.6	92.2	10.4	10.4 bantam sized
A	7	894		tibiotarsus	<i>Gallus gallus</i>	18.0	na	na	na	na	na bantam sized
A	7	894		tibiotarsus	<i>Gallus gallus</i>	16.9	na	5.4	95.4	9.8	9.9 bantam sized
A	11b	411		tibiotarsus	Galliforme cf chicken	na	na	5.6	na	na	na
A	11b	322		tibiotarsus	<i>Gallus gallus</i>	na	na	na	na	11.7	12.1
A	11b	458		tibiotarsus	<i>Gallus gallus</i>	21.1	117.4	6.8	na	11.7	12.2
B	6	2543	4347	tibiotarsus	Galliforme cf chicken	16.5*	na	na	na	na	na
B	6	2543	4347	tibiotarsus	Galliforme cf chicken	na	na	na	na	9.8	na
B	11	2444		tibiotarsus	Galliforme cf chicken	17.4	na	na	na	na	na
B	11	2453		tibiotarsus	Galliforme cf chicken	na	na	na	na	11.1	10.2*
B	11	2570		tibiotarsus	<i>Gallus gallus</i>	22.3*	114.4	na	109.9	11.9	12.3*

Ulna

area	phase	context	sample	element	species	Bp	Dip	GL	SC	Did
A	5	625	4705	ulna	Galliforme cf chicken	na	na	na	4.3	9.0
A	7	755		ulna	Galliforme cf chicken	8.6*	11.1	62.0	4.3	6.9 bantam sized
A	7	888	4638	ulna	Galliforme cf chicken	na	na	na	3.6	9.0 bantam sized
A	7	888	4638	ulna	Galliforme cf chicken	na	na	na	na	8.6
A	11b	287		ulna	Galliforme cf chicken	na	na	na	na	8.9
A	11b	320		ulna	Galliforme cf chicken	9.4	13.6	na	na	na
A	11b	489		ulna	Galliforme cf chicken	na	na	na	na	8.7
A	11b	604		ulna	Galliforme cf chicken	8.2	11.8	61.3	3.7	8.7
A	11b	244		ulna	<i>Gallus gallus</i>	8.1	11.6	59.6	3.9	8.5
B	6	2498	4368	ulna	Galliforme cf chicken	8.4	11.0	na	na	na
B	6	2513	4344	ulna	Galliforme cf chicken	7.8	11.3	na	na	na
B	6	2513	4382	ulna	Galliforme cf chicken	7.8	11.4	59.7	4.1	
B	11	2481		ulna	<i>Gallus gallus</i>	8.7	9.1*	na	na	na
B	11	2493		ulna	<i>Gallus gallus</i>	na	na	na	3.8	9.0
B	11	2494		ulna	<i>Gallus gallus</i>	8.5	11.4	58.0	3.8	8.6
B	11	2560		ulna	<i>Gallus gallus</i>	10.2	14.1	76.3	4.5	10.5
B	11	2562		ulna	<i>Gallus gallus</i>	9.7*	na	na	na	na

BIBLIOGRAPHY

Abbreviations

<i>BMCRE</i> :	Mattingly 1923
<i>CC</i> (+ type)	Nieto and Puig 2001
<i>CIL</i> iv	Zangenmeister and Schoene 1871
<i>CIL</i> x	Mommsen 1883
Déch (+ type no)	Déchelette 1904
<i>JCAS</i>	<i>J Chester Archaeol Soc</i>
<i>LRBC</i>	Hill <i>et al</i> 1960
<i>NoTS</i>	Hartley and Dickinson 2008–11
Osw (+ type no)	Oswald, F 1936/37
RGZM (+ Ser no)	<i>Römisch-Germanisches Zentral-museum</i> , Mainz database of samian records; http://www.rgzm.de/samian/home/frames.htm
RIB I	Collingwood and Wright 1965;
RIB II	Fasc 1, Frere <i>et al</i> 1990; Fasc 2, Frere and Tomlin 1991; Fasc 4, Frere and Tomlin 1992; Fasc 6, Frere and Tomlin 1994
RIB III	Tomlin <i>et al</i> 2009
<i>RIC</i>	Mattingly <i>et al</i> 1923–2007
Rogers (+ type no)	Rogers 1974
SandS	Stanfield and Simpson 1958

Original sources

<i>Anglo Saxon Chronicle</i>	Garmonsway (trans) 1960
Balbus, <i>Expositio et ratio omnium formarum</i>	Blume <i>et al</i> 1848–52
Catullus, Carmina	Goold (rev) 1989
Columella, <i>De re rustica</i>	Forster and Heffner (trans) 1979
Pliny the Elder, <i>Naturae historiarum</i>	Rackham (trans) 1968
Pliny the Younger, <i>Epistulae</i>	Radice (trans) 1969

Ranulph Higden, <i>Polychronicon</i>	Babington, C and Lumby J R (eds) 1886
Juvenal, <i>Saturae</i>	Brand (trans) 2004
Martial, <i>Epigrammata</i>	Shackleton-Bailey (ed and trans) 1993
Ovid, <i>Ars amatoria</i>	Goold (rev) 1979
Seneca, <i>Epistulae</i>	Gummere (trans) 1917

Modern sources

- NB ‘Grey literature’ reports and internal documents appear in square brackets []
- [Ainsworth, S and Wilmott, T 2004a *The Chester Amphitheatre: Project Design for Non-Invasive Archaeological Survey*, English Heritage Internal Document]
- Ainsworth, S and Wilmott, T 2004b *Chester Amphitheatre: from gladiators to gardens* (Swindon: English Heritage and Chester City Council)
- Alcock, J 2001 *Food in Roman Britain* (Stroud: Tempus)
- Alcock, J P 2009 ‘Pisces in Britannia. The eating and portrayal of fish in Roman Britain’, in Walker, H (ed) *Fish: Food from the Waters Proceedings of the Oxford Symposium on Food and Cookery 1997* (Totnes: Prospect Books), 20–35
- Alicu, D 1997 *Ulpia Traiana sarmizegetusa Amfetrul 1*, Biblioteca Musei Napocensis, **16** (Cluj-Napoca: Muzeul National de Istorie a Transilvaniei)
- Allason-Jones, L 1991 ‘Objects of copper alloy’ in Holbrook and Bidwell 1991, 242–263
- Allason-Jones, L 2007 ‘The small objects’ in Hanson 2007, 396–443
- Allason-Jones, L and Bishop, M C 1988 *Excavations at Roman Corbridge: the Hoard*, English Heritage Archaeol Rep, **7** (London: HBMCE)
- Allason-Jones, L and Miket, R 1984 *The catalogue of small finds from South Shields Roman fort*, Soc Antiq Newcastle upon Tyne Monogr Ser, **2** (Gloucester: Sutton)
- Allen, D 1997 ‘Glass’, in Marvell and Owen-John 1997, 387–93
- Allen, D 2000 ‘The glass’ in Evans, E, 2000, 424–43
- [Allen M G 2011 *Animalscapes and Empire: New Perspectives*

- on the Iron Age/Romano-British Transition. Unpublished PhD Thesis, University of Nottingham]
- Atkinson, D 1914 'A hoard of samian ware from Pompeii', *J Roman Stud*, **4**, 26–64
- Babington, C and Lumby, J R (eds) 1886 *Polychronicon Ranulphi Higden, monachi Cestrensis*, Rolls Series **4**, (London: Longman)
- Bacher, A 1967 *Vergleichende morphologische Untersuchungen an Einzelknochen des postcranialen Skeletts in Mitteleuropa vorkommender Schwäne und Gänse* (Institut für Palaeo- nantomie, Domestikationsforschung und Geschichte der Tiermedizin der Universität München)
- Baker, P 2006 "what you see is what you get": an experiment to improve our understanding of environmental sampling strategies' in *English Heritage* 2006, 28–30
- Balsan, L and Vernhet, A 1971 *Une grande lagène de La Graufesenque, Gallia* **29** (1) 73–108
- Banducci, L M 2013 *Foodways and cultural identity in Roman Republican Italy*, <http://hdl.handle.net/2027.42/102484>, accessed 8/12/2015
- Banducci, L M 2015 'Fuel, cuisine and food preparation in Etruria and Latium: cooking stands as evidence for change', in Spataro and Villing (eds) 2015, 157–9
- Barberan, S, Piques, G, Raux, S, Sanchez, C avec Houix, B 2006 *Un dispositif de cuisson original en Languedoc dans l'antiquité: les fours à pain à cloche mobile en céramique*, *SPECAG, Actes du Congrès de Pézenas*, 257–71
- Barratt, J 2003 *The Great Siege of Chester* (Stroud: Tempus)
- Barrow, J S, Herson, J D, Lawes, A H, Riden, P J and Seaborne, M V J 2005 'Churches and religious bodies: The collegiate church of St John', in Thacker, A T and Lewis, C P (eds) *A History of the County of Chester: Volume 5 Part 2, the City of Chester: Culture, Buildings, Institutions*, (London: VCH), 125–133
- Bateman, N 2009 'What's the point of London's amphitheatre? – a clue from Diana', in Wilmott a (ed) 2009, 157–63
- Bateman, N, Cowan, C and Wroe-Brown, R 2008 *London's Roman amphitheatre: Guildhall Yard, City of London*, Museum of London Archaeol Service Monogr, **35** (London: MOLAS)
- Bateman, N and Locker, A 1982 'The sauce of the Thames', *The London Archaeologist*, **4**, 204–07
- [Baum, J 2010 *Plans and Reference Images for Chester's Roman Amphitheatre* (Chester: Take 27)]
- Baumel, J J 1979 *Nomina anatomica avium: an annotated anatomical dictionary of birds* (New York: Academic Press)
- [Baxter, I L 2009 *Delamere Street, Chester (CHE/DEL/06 BA 1410): The Animal Bones* (Birmingham Archaeology unpublished report)]
- Baxter, I L 2012. 'The Animal Bone', in Cuttler *et al* 2012, 119–145
- Bayley, J and Butcher, S 2004 *Roman brooches in Britain: A technological and typological study based on the Richborough collection*, Reps Res Comm, Soc Antiqs London, **68** (London: Society of Antiquaries of London)
- Bekker-Nielsen, T 2010 'Fishing in the Roman World', in Bekker-Nielsen, *et al*, 187–204.
- Bekker-Nielsen, T and Casasola, D B (eds) 2010 *Ancient Nets and Fishing Gear: Proceedings of the International Workshop on "Nets and Fishing Gear in Classical Antiquity: A First Approach"*, (Cádiz: Universidad de Cádiz)
- Bell, M 2007 *Prehistoric coastal communities in western Britain*, CBA Res Rep **149** (York: CBA)
- Bémont, C and Jacob, J-P 1986 *La terre sigillée gallo-romaine. Lieux de production du Haut Empire: implantations, produits, relations, Documents d'Archéologie Française*, **6** (Paris: Maison des Sciences de l'Homme)
- Ben Abdullah, Z, Ben Hassan, H and Maurin, L 1998 'L'histoire d'Uthina par les textes', in Ben Hassan, H and Maurin, L (eds), *Oudhna (Uthina): la redécouverte d'une ville antique de Tunisie, Ausonius Mémoires*, **2** (Bordeaux: Ausonius), 63–104
- Ben Hassan, H and Golvin, J-CI 2004 'L'amphithéâtre de Oudhna: exploration archéologique et étude architectural' in Ben Hassan and Maurin 2004b, 117–146
- Ben Hassan, H and Maurin, L 2004a 'L'amphithéâtre de Oudhna: le dossier épigraphique', in Ben Hassan and Maurin 2004b, 147–80
- Ben Hassan, H and Maurin, L (eds) 2004b *Oudhna (Uthina), colonie de vétérans de la XIII^e légion: histoire urbanisme, fouilles et mise en valeur des monuments*, Ausonius Mémoires, **13**, (Ausonius: Bordeaux)
- Bennett, K D 1994 *Annotated catalogue of pollen and pteridophyte spore types of the British Isles*. (unpublished) Available at: <http://www.arcc.shef.ac.uk/content/1/c6/05/62/92/bennett.pdf>
- Bennett, K D, Whittington, G, and Edwards, K J 1994 'Recent plant nomenclatural changes and pollen morphology in the British Isles' *Quaternary Newsletter*, **73**, 1–6
- Berggren, G 1962 'Reviews on the taxonomy of some species of the genus Brassica based on their seeds', *Svensk. Bot. Tidskr.* **56**, 65–135
- Berggren, G, 1981 *Atlas of seeds and small fruits of northwest-European plant species (Sweden, Norway, Denmark, East Fennoscandia and Iceland) with morphological descriptions: part 3* (Swedish Museum of Natural History, Berlings: Arlöv)
- Berridge, P 1994 'The Lithics' in Quinnell, H and Blockley, M R, *Excavations at Rhuddlan, Clwyd 1969–73: Mesolithic to Mediaeval*, CBA Res Rep, **95**, (London: CBA) 95–114
- Betts, I 2000 'The ceramic building material: Roman tile types' in Poole, C *Bath Spa redevelopment project: results of the 1998–1999 excavation*, 1–6. <http://homepages.tesco.net/~cynbyn/index.htm>, accessed 12/2/2006
- Betts, I M 2008 'The building materials', in Bateman *et al* 2008, 164–8
- Biddulph, E 2008 'Form and function: the experimental use of Roman samian ware cups', *Oxford J Archaeol*, **27** (1), 91–100
- Bird, D (ed) 2012 *Dating and interpreting the past in the western Roman Empire. Essays in honour of Brenda Dickinson* (Oxford: Oxbow Books)
- Bird, J 1986 'Samian', in Miller, L, Schofield, J and Rhodes, M, *The Roman quay at St Magnus House, London, excavations at New Fresh Wharf, Lower Thames Street, London 1974–78*, London London Middx Archaeol Soc Special Paper, **8**, 139–85
- Bird, J 1989 'The samian', in Fulford 1989, 80–3
- Bird, J 2008 in Bateman *et al* 2008
- Bird, J 2012 'Arena scenes with bulls on South Gaulish samian', in Bird, D (ed) 2012, 135–48
- Bird, J 2013 'Samian in religious and funerary contexts: a question of choice', in Fulford and Durham (eds) 2013, 326–339
- Bird, J (ed) 1998 *Form and fabric. Studies in Rome's material past in honour of B R Hartley* (Oxford: Oxbow Books)
- Bird, J and Dickinson, B 2014 'The samian', in Darling, M and Precious, B A, *Corpus of Roman Pottery from Lincoln*, (Oxford: Oxbow Books), 233–92

- Birley, A R 1973 'Petillius Cerialis and the Conquest of Brigantia', *Britannia*, **4**, 179–90
- Birley, R 2008 *Vindolanda's treasures, an extraordinary record of life on Rome's northern frontier* (Greenhead: Roman Army Museum for the Vindolanda Trust)
- [Bishop, B 2013 *Archaeological Investigations during the Chester Amphitheatre Project. Site Code: CHE/AMP04. Project 3696: Lithic Assessment* (unpublished assessment report)]
- Bishop, M C 1986 'The distribution of military equipment within Roman forts of the first century AD' in Unz (ed) *Studien zu den Militärgrenzen Roms III; Vorträge des 13. Internationaler Limeskongress Aalen 1983* (Stuttgart: Landesdenkmalamt Baden Württemberg), 717–23
- Bishop, M C 1987 'The evolution of certain features', in Dawson, M (ed) *Roman military equipment: the accoutrements of war. Proceedings of the third Roman military equipment research seminar*, BAR Int Ser **336** (Oxford: Brit Archaeol Reps), 109–139
- Bishop, M C 1988 'Cavalry equipment of the Roman army in the first century A.D.', in Coulston, J C (ed), *Military equipment and the identity of Roman soldiers. Proceedings of the fourth Roman military equipment conference*, BAR Int Ser **394** (Oxford: Brit Archaeol Reps), 67–195
- Bishop, M C 1998 'Military equipment' in Cool and Philo (eds) 1998, 61–81
- Bishop, M C 2002 *Lorica Segmentata Vol I: A Handbook of Articulated Roman Plate Armour*, J Roman Military Equip Studs Monogr, **1** (Duns: The Armatvra Press)
- Bishop, M C 2009 'The body armour', in Howard-Davis 2009, 687–705
- Bishop, M C and Coulston, J C N 1993 *Roman military equipment from the Punic Wars to the fall of Rome* (London: Batsford)
- Bishop M C and Howard-Davis C 2009 'The Roman militaria', in Howard-Davis 2009, 687–724
- Black, E W 1996 'Box flue tiles in Britannia: the spread of Roman bathing in the first and second centuries', *Archaeol J*, **153**, 60–78
- Blagg, T F C 1999 'The ornamentation and parapet of the walls', in Le Quesne 1999, 110–11
- Blandford, P W 1974 *Country Craft Tools* (Newton Abbot: David and Charles)
- Blasco, P D 2014 'Redefining the Urban landscape in Hispania; entertainment buildings and their transformations in late antiquity', *Hortus Artium Medievalium*, **20/1**, 25–37
- Blin, S and Marc, J-Y 2016 'Le théâtre de Mandeure, relation et intégration au sanctuaire' in Hufschmid, T (ed) *Theaterbauten als Teil monumentaler Heiligtümer in den nordwestlichen Provinzen des Imperium Romanum: Architectur – Organisation – Nutzung: Internationales Kolloquium in Augusta-Raurica, 18–21 September 2013*, Forschungen in August, **50**, (Basel: Augusta Raurica)
- Blockley, K 1989a *Prestatyn 1984–5: An Iron Age and Romano-British industrial settlement in North Wales*, BAR Brit Ser, **210** (Oxford: Brit Archaeol Reps)
- Blockley, K 1989b 'Miscellaneous objects of copper alloy', in Blockley 1989a, 100–104
- Blockley, K 1989c 'The coarse pottery', in Blockley 1989a, 156–70
- Blume, F, Lachman, K, and Rudorff, A (eds) 1848–52 *Gromatici Veteres: die Schriften der Römischen Feldmesser*, (Berlin: Georg Reimer)
- Boardman, S and Jones, G 1990 'Experiments on the effects of charring on cereal plant components', *J Archaeol Sci*, **17(1)**, 1–11
- Boessneck, J 1969 'Osteological differences between Sheep (*Ovis aries* Linne) and Goat (*Capra hircus* Linne)' in Brothwell and Higgs (eds) 1969, 331–58
- Bogaard, A 2004 *Neolithic Farming in Central Europe. An archaeobotanical study of crop husbandry practices* (Abingdon: Routledge)
- Bogdanović, I and Nikolić, S 2017 'In the Beginning There Was a Timber Construction ... The Wooden Amphitheatre of Viminacium', in Mitthof, F and Schörner, G, *Columna Traiani – Traianssäule Siegesmonument und Kriegsbericht in Bildern, Beiträge der Tagung in Wien anlässlich des 1900. Jahrestages der Einweihung, 9.–12. Mai 2013*, TYCHE Sonderband, **9** (Vienna: Holzhausen), 87–95
- Böhme, G 1977 'Zur Bestimmung quartärer Anuren Europas an Hand von Skelettelementen', *Wissenschaftlich Zeitschrift der Humboldt Universität zu Berlin, Math.-Nat. R.* **26**, 3.
- Bomgardner, D L 1993 'A new era for amphitheatre studies', *J Roman Archaeol*, **6**, 375–90
- Bomgardner, D L 2000 *The Story of the Roman Amphitheatre* (London: Routledge).
- Boon, G C 1972 *Isca: the Roman legionary fortress at Caerleon, Monmouthshire*, 3rd edn (Cardiff: National Museum of Wales)
- Bowes, K and Mitchell J 2009 'The main chapel of the Dures amphitheatre; decoration and chronology', *Melanges de l'école Française de Rome*, **121/2**, 571–97
- Braadbaart, F 2008 'Carbonisation and morphological changes in modern dehusked and husked *Triticum dicoccum* and *Triticum aestivum* grains', *Veg Hist and Archaeobot*, **17(1)**, 155–166
- Braadbaart, F and van Bergen, P F 2005 'Digital imaging analysis of size and shape of wheat and pea upon heating under anoxic conditions as a function of the temperature', *Veg Hist and Archaeobot*, **14(1)**, 67–75
- Bradley, R 1976 'Maumbury Rings, Dorchester: the excavations of 1908–1913', *Archaeologia*, **105**, 1–98
- Bradley, R and Edmonds, M 1993 *Interpreting the Axe trade: production and exchange in Neolithic Britain* (Cambridge: Cambridge University Press)
- Branch, N, Canti, M, Clark, P and Turney, C 2005 *Environmental Archaeology: theoretical and practical approaches* (London: Hodder Education)
- Brand, S M (trans) 2004 *Juvenal and Persius* (Cambridge, Mass: Loeb Classical Library)
- Breeze, D J 2006 *J Collingwood Bruce's Handbook to Hadrian's Wall* (14th edn) (Newcastle-upon-Tyne: Soc Antiqs Newcastle-upon-Tyne)
- Breeze, D J 2012 *The first souvenirs: enamelled vessels from Hadrian's Wall*, (Kendal: Cumberland Westmorland Antiq Archaeol Soc)
- Breeze, D J and Dobson, B, 2000 *Hadrian's Wall* (4th edn) (London: Penguin books)
- Bridel, P 2004 *Aventicum XIII, L'Amphithéâtre d'Avenches*, Cahiers d'Archéologie Romande, **96** (Lausanne)
- Bridger, C J 1984 'The *pes Monetalis* and the *pes Drusianus* in Xanten', *Britannia*, **15**, 85–98
- Britnell, W J 1989 'The Collfryn Hillslope Enclosure, Llansantffraid, Deuddwr, Powys: Excavations 1980–82', *Proc Prehist Soc*, **55**, 89–143
- Brock, F, Higham, T, Ditchfield, P and Bronk Ramsey, C 2010

- 'Current pretreatment methods for AMS radiocarbon dating at the Oxford Radiocarbon Accelerator Unit (ORAU)' *Radiocarbon*, **52**, 103–12
- Brodrribb, G 1987 *Roman brick and tile* (Gloucester: Alan Sutton)
- Bronk Ramsey, C 1995 'Radiocarbon calibration and analysis of stratigraphy: the OxCal program', *Radiocarbon*, **37**, 425–30
- Bronk Ramsey, C 1998 'Probability and dating', *Radiocarbon*, **40**, 461–74
- Bronk Ramsey, C 2001 'Development of the radiocarbon calibration program OxCal', *Radiocarbon*, **43**, 355–63
- Bronk Ramsey, C 2009 'Bayesian analysis of radiocarbon dates', *Radiocarbon*, **51**: 337–60
- Bronk Ramsey, C Higham, T and Leach, P 2004, Towards high precision AMS: progress and limitations', *Radiocarbon* **46**, 17–24
- Brooks, I P 2016 'The Lithic Collection from the area around Woodhouse Hillfort, Frodsham', in Garner *et al* 2016, 22–28
- Brothwell, D and Higgs, E (eds) 1969 *Science in Archaeology* (Bristol: Thames and Hudson)
- Bruet, R 2012 'La sigillée d'Argonne', in Bruet, R, Vilvorder, F and Delage, R, *La céramique romaine en Gaule du Nord. Dictionnaire des céramiques: La vaisselle à large diffusion* (Turnhout: Brepols), 153–67
- Bullock, A 2010 'Fish remains from the later Roman phases (Periods 6–7) at Victoria Road East', in Maltby, M, *Feeding a Roman Town: Environmental Evidence from Excavations in Winchester, 1972–1985* (Winchester: Winchester Museums), 238–245
- Bulmer, M 1979/80 'An introduction to Roman samian ware, with special reference to collections in Chester and the north-west', *J Chester Archaeol Soc*, **62**, 5–72
- Bulmer, M 1980 'The finds, pre-Roman to Saxo-Norman', in McPeake *et al* 1980, 22–32
- Buonocore, M 1992 *Epigrafia Anfiteatrale Dell'Occidente Romano II, Regioni Italiae ii-v, Sicilia, Sardinia et Corsica, Vetera*, **6** (Roma: Edizione Quasar)
- Business traveller 2012 www.business traveller.com/news/airline-results-revealed
- [Buxton, K 1993 *Dee House, Chester, Cheshire: archaeological evaluation*, (Lancaster: Lancaster University Archaeological Unit) (unpubl)]
- Buxton, K and Howard-Davis, C 2000 *Bremetenacum Excavations at Roman Ribchester 1980, 1989–1990*, Lancaster Imprints **9** (Lancaster, Lancaster University Archaeology Unit)
- Campbell, G 2006 'Plant remains', in Parfitt, K, Cooke, B, and Cotter, J, *Townwall Street, Dover excavations 1996* (Canterbury: Canterbury Archaeological Trust), 378–90
- [Campbell, G 2010 'Assessment of macroscopic plant remains and charcoal from Chester Amphitheatre excavations 2004 to 2006: phases 1a to 11b' Unpublished Assessment Report for English Heritage]
- Campbell, G and Straker, V 2003 'Prehistoric crop husbandry and plant use in southern England: development and regionality', in Robson Brown, K A (ed), *Archaeological sciences 1999: Proceedings of the archaeological sciences conference, University of Bristol 1999*, BAR Int Ser, **1111** (Oxford: Archaeopress), 14–30.
- Carrington, P 1985 'The Roman advance into the north-west midlands before AD 71', *J Chester Archaeol Soc*, ns **68**, 5–22
- Carrington, P (ed) 1996, *Chester Discovered: the archaeological exploration of an English city: J Chester Archaeol Soc*, **72**
- Carrington, P 2012a 'The extramural settlements: an overview' in Ward, S *et al*, 2012, 301–337
- Carrington, P 2012b 'Fortress, *canabae* and hinterland' in Ward, S *et al*, 2012, 338–415
- Carrington, P 2012c 'Greyfriars Court 1976–8 and 81/Building materials/Plaster' in Ward, S *et al*, 2012, 338–415
- Carrington, P 2012d 'Blackfriars House 1986/Building materials/Plaster', in Ward, S *et al*, 2012, 156
- Carrington, P and Heke, A 2012a 'Greyfriars House 1983/Building materials/Plaster', in Ward, S *et al*, 2012, 166–7
- Carrington, P and Heke, A 2012b '30–42 Nicholas Street 1974/Building materials/Plaster', in Ward, S *et al*, 2012, 150
- [Carrington, P and Ward, T E 1982 *Roman kiln wasters from the Chester vicus*, Chester City Council. (Archaeological Service unpublished archive report)]
- [Carrott, J and Beacock, A 2009 *Assessment of shell remains recovered from sediment samples and by hand collection from excavations at the Chester Amphitheatre, Chester*, Paleocology Research Services report **PRS 2009/22** (Durham: PRS)]
- Carruthers, W J 2002 'Plant remains', in Fairburn, N, 'Brook House Farm, Bruen Stapleford. Excavation of a first millennium BC settlement', *J Chester Archaeol Soc*, **22**, 34–9
- [Cartledge, J 1991 *Chester Animal Bone (WYASR26): Chester Roman Sites*, (West Yorkshire Archaeology Service unpublished report)]
- Cartledge, J 1994 'Environmental remains', in Ward S, *Excavations at Chester: Saxon Occupation within the Roman Fortress, Sites Excavated 1971–1981*, Archaeological Service Excavation and Survey Reports, **7** 108–114 (Chester: Chester City Council)
- Caruana, I 1999 Review of D Shotter 1996 'The Roman Frontier in Britain: Hadrian's Wall, The Antonine Wall and Roman Policy in the North', *Britannia*, **30**, 418
- Charlesworth, D 1959 Roman glass in northern Britain. *Archaeologia Aeliana*, **37**, 33–58
- Chenet, G and Gaudron, G 1955 *La céramique sigillée d'Argonne des IIe. et IIIe. siècles. Gallia suppl*, **6** (Paris: Centre National de la Recherche Scientifique)
- Cherry, P J 2009 *Flint and Tuff in Prehistoric Cumbria*, Internet Archaeology, **26**, http://intarch.ac.uk/journal/issue26/cherry_toc.html
- Clapham, A R, Tutin, T G and Moore, D M 1989 *Flora of the British Isles* (3rd ed) (Cambridge: Cambridge University Press)
- Clark, J G D 1935 'Derivative Forms of the Petit Tranchet in Britain', *Archaeol J*, **91**, 32–58.
- Clay, C 2004 'Iconoclasm in Roman Chester: the significance of the mutilated tombstones from the north wall', *J Brit Archaeol Assoc*, **157**, 1–16
- [Cleary, R, Edwards, J, Matthews, K 1994 *Dee House, Chester, Evaluation, March 1994*, Chester Archaeol Service, Evaluation Report, **30**]
- Cohen, A and Serjeantson, D 1996 *A Manual for the Identification of Bird Bones from Archaeological Sites* (London: A Cohen)
- Coleman, K M 1990 'Fatal charades: Roman executions staged as mythological enactments', *J Roman Studies*, **80**, 44–73
- Collingwood, R G and Wright, R P 1965 *The Roman Inscriptions of Britain, I, Inscriptions on stone* (Oxford: Clarendon Press)
- Cool, H E M 1998 'The needles, weights, table utensils, seal boxes, furniture, fittings, fastenings and miscellaneous objects' in Cool and Philo (eds) 1998, 91–117

- Cool, H 2000 'The parts left over: material culture into the fifth century' in Wilmott and Wilson (eds) 2000, 47–65
- Cool, H E M 2002 'An overview of the small finds from Catterick' in Wilson, P R 2002 *Cataractonium; Roman Catterick and its hinterland, excavations and research 1958–1997*, CBA Res Rep, **129** (York: CBA), Part 2, 24–43
- Cool, H E M 2004 *The Roman cemetery at Brougham, Cumbria*, Britannia Monogr Ser, **21** (London: Roman Society)
- Cool, H E M 2006 *Eating and drinking in Roman Britain* (Cambridge: Cambridge University Press)
- Cool, H E M 2012a 'The Roman small finds', in Cuttler *et al* 2012, 92–108
- Cool, H E M 2012b 'The Roman vessel glass', in Cuttler *et al* 2012, 87–91
- Cool, H E M 2012c 'Glass', in Ward, S *et al* 2012, 182–3
- Cool, H E M 2016 'Recreation or decoration: what were the glass counters from Pompeii used for?', *Papers Brit School Rome*, **84**, 157–77
- Cool, H E M and Baxter, M J 2002 'Exploring Romano-British finds assemblages', *Oxford J Archaeol*, **21** (4), 365–80
- Cool, H E M and Leary, R S 2012 'Aspects of the use of samian pottery in Romano-British funerary practices', in Bird (ed) 2012, 305–18
- Cool, H E M and Philo C (eds) 1998 *Roman Castleford. Excavations 1974–85 Volume 1 – the small finds*, Yorkshire Archaeology, **4** (Wakefield: West Yorkshire Archaeology Service)
- Cool, H E M and Price, J 1995 *Roman vessel glass from excavations in Colchester, 1971–85*, Colchester Archaeol Rep **8** (Colchester: Colchester Archaeological Trust)
- Cool, H E M and Price, J 2002 'Vessel glass from Catterick Bypass (site 433)', in Wilson 2002, 213–233
- Cool, H E M, Lloyd-Morgan, G and Hooley, A D 1995 *Finds from the fortress*, The archaeology of York – the small finds Vol **17** Fasc **10**, York Archaeological Trust. (York: CBA)
- Cooley, A E and Cooley, M G L 2004 *Pompeii: a Sourcebook* (London: Routledge)
- Cooley, A E and Cooley M G L 2013 *Pompeii and Herculaneum: a Sourcebook* (London: Routledge)
- [Cootes, K V E and Emery, M M, 2014 *The Excavation of Ring-Ditches Two and Three at Poulton, Cheshire. 2010–2013*. An Interim Report (Poulton Research Project)]
- Cootes K V E, 2015. 'One field, 10,000 years: the Poulton Research Project' *Brit Archaeol*, **Nov/Dec 2015**, 52–7.
- Cootes, K V E, Cowell, R and Teather, A 2017 'Hunting for the gatherers and early farmers of Cheshire: an investigation of prehistoric land use in Chapel field, Poulton', *J Chester Archaeol Soc*, **86**, 11–32
- Corran, H S 1975 *A History of Brewing* (Newton Abbott: David and Charles)
- Cotton, J 2004 'Two decorated Peterborough bowls from the Thames at Mortlake and their London context', in Cotton and Field (eds) 2004, 128–47
- Cotton, J and Field, D (eds) 2004 *Towards a New Stone Age: aspects of the Neolithic in south-east England*, CBA Res Rep, **137** (York: Council for British Archaeology)
- Coward, T A (ed) 1910 *The Vertebrate Fauna of Cheshire and Liverpool Bay, Volume 1: The Mammals and Birds of Cheshire* (London: Witherby & Co) Available from <http://www.biodiversitylibrary.org/item/103298#page/13/mode/1up>
- Cowell, R W 2005 'Prehistoric Hunter-Gatherers on Alderley Edge', in Timberlake, S and Prag, A J N W, *The Archaeology of Alderley Edge: Survey, Excavation and Experiment in an Ancient Mining Landscape*, BAR Brit Ser, 396 (Oxford: Archaeopress), 20–32
- Cowell, R W 1992 'Prehistoric survey in North Cheshire', *Cheshire past. An annual review of archaeology in Cheshire*, **1**, 6–7.
- Cowell, R W and Innes, J B 1994 *The wetlands of Merseyside*, Lancaster Imprints, **1** (Lancaster: Lancaster University Archaeological Unit)
- Cowell, R W and Philpott, R A 2000 *Prehistoric, Romano-British and Medieval Settlement in Lowland North West England. Archaeological excavations along the A5300 road corridor in Merseyside* (Liverpool: National Museum and Galleries on Merseyside)
- Cowie, R, Blackmore, L, Davis, A, Kielly, J and Rielly, K 2012 *Lundenwic: Excavations in Middle Saxon London 1987–2000*, Museum London Archaeol Monogr Ser, **63** (London: MOLA)
- Crawford, A 2014 'Ceramic oven material' in Sworn *et al*, 97–100
- Creighton, J 2006 *Britannia: the creation of a Roman province* (London: Routledge)
- Croom, A T 2002 *Roman Clothing and Fashion* (Stroud: Tempus Publishing)
- Crosby, A G 1999 *The Chester Archaeological Society: the first one hundred years* (Chester: Chester Archaeol Soc)
- [Crosby, V M 1990 *Agricultural change in Later Prehistoric and Roman Britain*, (unpublished PhD thesis, University of Southampton)]
- Crummy, N 1983 *The Roman small finds from excavations in Colchester 1971–9*, Colchester Archaeol Rep **2**, (Colchester: Colchester Archaeological Trust)
- Cubberley, A, Lloyd, J and Roberts, P 1988 'Testa and clibani: the baking covers of classical Italy', *Pap Brit School Rome*, **56**, 98–119
- Cunliffe B, 2005 *Iron Age Communities in Britain* (4th edn) (London: Routledge)
- Cüppers, H 1993 *Trier Amphitheater: Führer der Verwaltung der Staatlichen Burgen* (Mainz: Schlösser und Altertümer Rheinland-Pfalz)
- Cuttler, R, Hepburn, S, Hewitson, C and Krawiec, K 2012 *Gorse Stacks – 2000 years of quarrying and waste disposal in Chester*, BAR Brit Ser, **563** (Oxford: Archaeopress and Birmingham Archaeology)
- Dannell, G B 1999 'Decorated South Gaulish samian', in Symonds, R P and Wade, S *Roman pottery from excavations in Colchester, 1971–86*, Colchester Archaeol Trust Report, **10**, 13–74
- Dannell, G B 2006 'Samian cups and their uses', in Wilson, R J A and Frere, S (eds), *Romanitas: Essays on Roman archaeology in honour of Sheppard Frere on the occasion of his ninetieth birthday* (Oxford: Oxbow Books), 147–76
- Dannell, G B 2012 'The origins of the samian form Dragendorff 37: "the weight of the evidence"', in Bird (ed) 2012, 58–69
- Dannell, G B, Dickinson, B and Vernhet, A 1998 'Ovolos on Dragendorff form 30 from the collections of Frédéric Hermet and Dieudonné Rey', in Bird (ed) 1998, 69–109
- Dannell, G B, Dickinson, B M, Hartley, B R, Mees, A W, Polak, M, Vernhet, A and Webster, P V 2005 *Gestempelte südgalische Reliefsigillata (Drag 29) aus den Werkstätten von La Graufesenque* (Mainz: Römische-Germanische Zentral Museum)

- Darling, M J 1998 'Samian from the City of Lincoln: a question of status?', in Bird (ed) 1998, 169–77
- Darling, M J 2012 'Stuffed dormice or tandoori chicken in Roman Britain?', in Bird (ed) 2012, 346–57
- Davis, S J M 1980 'Late Pleistocene and Holocene Equid Remains from Israel', *Zoological J Linnéan Soc*, **70**, 289–312.
- Davey and Ling, R 1982 *Wall painting in Roman Britain* (Gloucester: Alan Sutton)
- Dawson, M 1997 'Ironwork', in Marvell and Owen-John 1997, 234–73
- Déchelette, J 1904 *Les vases céramiques ornés de la Gaule romaine, tome 2*. (Paris: Picard et fils)
- Dekker, W and Beaulaton, L 2016 'Climbing back up what slippery slope? Dynamics of the European eel stock and its management in historical perspective', *ICES J Marine Sci*, **73**, 5–13
- Demarolle, J M 2002 *Images simplifiées et stylistique iconographique: la gladiature sur les Drag. 37 au haut empire*, in Genin, M and Vernhet, A (eds), *Céramiques de La Graufesenque et autres productions d'époque romaine. Nouvelles recherches. Hommages à Bettina Hoffmann, Archéologie et histoire romaine*, **7** (Montagnac: M Mergoil), 201–10
- [Devine, V and Clarke, J 2003 *Cheshire Historic Towns Survey. Audlem: Archaeological assessment, Cheshire County Council*]
- de Moulins, D 1996 'Charred Plant Remains' in Wainwright, G J and Davies, S M, *Balksbury Camp, Hampshire: excavations 1973 and 1981* (London: English Heritage) 87–92
- Déry, C A 1998 'Fish as food and symbol in Ancient Rome', in Walker, H (ed) *Fish: Food from the Waters, Proceedings of the Oxford Symposium on Food and Cookery 1997* (Totnes: Prospect Books), 94–115
- de Voogt, A 2010 'Mancala players at Palmyra', *Antiquity*, **84**, 1055–66
- Dickinson, B 1991 'The samian ware', in Taylor, J, *The Roman pottery from Castle Street, Carlisle: excavations 1981–2*, Cumberland Westmorland Antiq Archaeol Soc Res Ser, **5.5** (Kendal), 344–66
- Dickinson, B 1992 'Samian ware', in Caruana, I D, 'Carlisle: excavation of a section of the annexe ditch of the first Flavian fort, 1990', *Britannia* **23**, 51–8
- Dickinson, B M 1997 'Samian' in Monaghan 1997, 943–66
- Dickinson, B 2000 'Samian', in Buxton and Howard-Davis 2000, 202–24
- Dickinson, B 2005 'Decorated and stamped samian', in Bishop, M C, 'A new flavian military site at Rocliffe, North Yorkshire', *Britannia*, **36**, 164–66
- Dickinson, B M and Hartley, B R 1993 'Illustrated samian' in Monaghan, J, *Roman Pottery from the Fortress, The archaeology of York – the pottery Vol 16 Fasc 7*, York Archaeological Trust. (York: CBA), 745–69
- Dickinson, B and Hartley, B R 2000 'The Samian', in Philo, C and Wrathmell, S (eds), *Roman Castleford excavations 1974–85; Volume III, the pottery*, Yorkshire Archaeology, **5** (Wakefield: West Yorkshire Archaeology Service), 5–88
- Dickson, CA 2011 'Distinguishing seeds of Brassica spp. characters selected from Berggren 1962 and 1981' Table and notes originally compiled by Camilla Dickson for the Archaeobotany Workgroup, Glasgow, May 1994. Edited by Zoë Hazell (English Heritage) and published by kind permission of Prof. J H Dickson, June 2011 <http://www.english-heritage.org.uk/professional/research/heritage-science/environmental-archaeology/archaeobotany-groups/archaeobotanical-work-group>
- Dobney, K and Ervynck, A 2007 'To fish or not to fish? Evidence for the possible avoidance of fish consumption during the Iron Age around the North Sea', in Haselgrove, T and Moore, T (eds), *The Later Iron Age in Britain and Beyond* (Oxbow: Oxbow Books), 403–418
- Dobney, K, Hall, A R, Kenward, H K and Milles, A 1992 'A working classification of sample types for environmental archaeology', *Circaea*, **9**, 24–6
- Dodd, L 2010a 'Fine and coarse wares', in Dodd, L, 'Excavation of a Roman roadside settlement at Stockton Heath, Warrington 2007', *J Chester Archaeol Soc*, **81**, 5–64
- [Dodd, J L 2010b *Refurbishment and improvement works at Albion House, Albion Street, Chester: an archaeological watching brief*, Earthworks Archaeological Services, EAS doc. **E870RPT**]
- Donahue, R E and Lovis, W A 2006 'Regional Settlement Systems in Mesolithic Northern England: scalar issues in mobility and territoriality', *J Anthropological Archaeol*, **25**, 248–258.
- Domergue, C, Fincker, M, Paillet, J M and Rico, C 2006 *L'amphithéâtre Romain de Purpan Ancely à Toulouse*, Guides archéologiques du Musée Saint Raymond, 2 (Toulouse: Odysée)
- [Donald Insall Associates 2001 *Chester Amphitheatre Conservation Plan, Summary Document (Part 1), Study of Future Options and Draft Strategy (Part 2)*]
- Donnelly, A J 2015 'Cooking pots in ancient and late antique cookbooks', in Spataro, M and Villing, S (eds) 2015, 141–7
- Dragendorff, H 1895 'Terra sigillata. Ein Beitrag zur Geschichte der griechischen und römischen keramik', *Bonner Jahrbuch* **96**, 18–155
- Duncan-Jones, R P 1980 'Length-units in Roman town planning the *Pes Monetalis* and the *Pes Drusianus*', *Britannia*, **11**, 127–33
- [Dunn, G 2001a 'The Roman pottery' in Garner, D 2001, 21–24]
- [Dunn, G 2001b 'Roman building materials', in Matthews *et al* 2001, 70–1]
- [Dunn, G 2002 'Roman building materials'. in Matthews *et al* 2002, 5]
- [Dunn, G 2003a 'The Roman Pottery' in Matthews *et al* 2003, 44–46]
- [Dunn, G 2003b 'Roman building materials', in Matthews *et al* 2003]
- Dunn, G 2012 'Sedan House 1989/Building materials', in Ward, S *et al*, 2012, 235–42
- Dunn, G, Jones, A and Mason, D J P 2005 'Building materials', in Mason, D J P 2005, 87–9
- Durán Cabello, R-M 2004 *El Teatro y el Amphiteatro de Augusta Emerita: contribución al conocimiento histórico de la capital de Lusitania*, BAR Int Ser, **1207** (Oxford: Archaeopress)
- Duvernoy, S 2002 'Architecture and Mathematics in Roman Amphitheaters' in Williams, K and Rodrigues J F, *Nexus IV: Architecture and Mathematics* (Florence Kim Williams Books), 281–93
- Dyggve, E 1933, 'L'amphithéâtre' in *Recherches a Salone*, **2** (Copenhagen), 35–150
- Dzwiza, K 2004 *Ein Depotfund reliefzierter südgallischer Terra Sigillata-Schüsseln aus Pompeji* (Mainz: Römisch-germanisches Zentralmuseum)

- Earp, J R and Taylor, B J 1986 *Geology of the country around Chester and Winsford* (London: HMSO)
- Ebeling, J and Rogel, M 2015 'The tabun and its misidentification in the archaeological record', *Council Brit Research Levant*, **47** (3), 328–49
- Ede, J 1999 'Charred seeds' 116–124 in McKinley, J I (ed) 'Excavations at Ham Hill, Montacute, Somerset 1994 and 1998' *Somerset Archaeol and Nat Hist*, **142**, 77–138
- Edlin, H L 1949 *Woodland crafts in Britain* (London: Batsford)
- Edwards, J and Paynter, S (eds) (forthcoming) *Recent research and new discoveries in glass and ceramics: Proceedings of the conference in memory of Sarah Jennings*, Medieval Pottery Research Group Occasional Paper (London: Medieval Pottery Research Group)
- Ellaby, R 2004 'Food for Thought: a Late Mesolithic site at Charlwood, Surrey', in Cotton and Field (eds) 2004, 12–23
- Ellenberg, H 1979 'Zeigerwerte der Gefäßpflanzen Mitteleuropas' *Scripta Geobotanica*, **9** (2nd edn)(Göttingen), 1–122
- Ellis, A E 1969 *British Snails: A guide to the non-marine gastropoda of Great Britain and Ireland – Pleistocene to recent* (Oxford: Oxford University Press)
- Ellis, P (ed) 1993 *Beeston Castle, Cheshire: Excavations by Laurence Keen and Peter Hough, 1968–85*, English Heritage Archaeolog Rep, **23** (London: English Heritage)
- Elsen, J 2006 'Microscopy of historic mortars – a review', *Cement and Concrete Research*, **36** (8), 1416–24. http://romanportland.net/files/doc/seminar2008/jan_elsen_seminar2008s.pdf.
- Enghoff, I B, 1994 'Fishing in Denmark during the Ertebølle Period', *Int J Osteoarchaeology*, **4**, 65–96
- English Heritage, 1991 *Management of Archaeological Projects MAP 2* (London: English Heritage)
- English Heritage, 2006, *Research News 4* (Swindon: English Heritage)
- ErgoTMC 2016 www.ergotmc.gtri.gatech.edu/dgt/Design_Guidelines/hndch703.htm
- Espérandieu, E 1911 *Receuil général des bas-reliefs, statues et bustes de la Gaule Romaine. Vol 4.* (Paris: Leroux)
- Espérandieu, E 1925 *Receuil général des bas-reliefs, statues et bustes de la Gaule Romaine. Vol 9.* (Paris: Leroux)
- Ettlinger, E and Gonzenbach, V von 1951–2 'Die Graben am Schütthugel 1952' *Gesellschaft pro Vindonissa Jahresbericht*, 29–54
- Ettlinger, E and Gonzenbach, V von 1955–6 'Die Graben am Schütthugel 1952' *Gesellschaft pro Vindonissa Jahresbericht*, 35–52
- Ettlinger, E and Simonett, C 1952 *Römischer Keramik aus dem Schütthugel von Vindonissa* (Basel: Verlag Birkhauser)
- Eurostar 2017 <http://www.eurostar.com/uk-en/travel-info/your-trip/eurostar-seating-plan>
- Evans, D R 1997 'Objects of lead', in Marvell and Owen-John 1997, 289–96
- Evans, A A, Langer, J L, Donahue, R E, Wolfram, Y B and Lovis, W A 2010 'Lithic Raw Material Sourcing and the Assessment of Mesolithic Landscape Organization and Mobility Strategies in Northern England', *The Holocene*, **20** (7) 1157–1163.
- Evans, A A, Wolfram, Y B, Donahue, R E and Lovis, W A 2007 'A Pilot Study of "Black Chert" Sourcing and Implications for Assessing Hunter-gatherer Mobility Strategies in Northern England', *J Archaeol Sci*, **34**, 2161–2169
- Evans, C J, Jones, L and Ellis, P 2000 'Severn Valley ware production at Newland Hopefields. Excavation of a Roman-British kiln site at North End Farm, Great Malvern, Worcestershire in 1992 and 1994', *Birmingham Univ Field Archaeology Unit Monogr ser*, **2**, BAR Brit ser, **313** (Oxford: Brit Archaeol Reps)
- Evans, E 2000 *The Caerleon canabae: excavations in the civil settlement 1984–90*, Britannia Monogr Ser, **16** (London: Roman Society)
- Evans, J 1987 'Graffiti and the evidence of literacy and pottery use in Roman Britain', *Archaeol J*, **144**, 191–204
- Evans, J 2014 'The great Roman bake off? 'Portable' ceramic ovens and bake-stones, recent finds', *Study Group for Roman Pottery Newsl*, **57**, 6–9
- Fagan, G G 2005 *Bathing in public in the Roman world* (Ann Arbor: University of Michigan Press)
- Fairburn, N 2002 'Brook House Farm, Bruen Stapleford. Excavation of a First Millennium BC Settlement', *J Chester Archaeol Soc*, **77**, 9–57
- Feugère, M 2003 'Penknives from Newstead: writing accessories', *Lucerna*, **26**, 9–11
- Fincker, M, Labarthe, J-M, Picard, V 2015 'La groma, le théâtre et l'archéologue', in Boube, E, Bouet, A and Colleoni, F (eds), *De Rome à Lugdunum des Convènes. Hommages à Robert Sablayrolles, Aquitania*, suppl. **31** (Bordeaux: Mém. Ausonius), 213–238
- Flower, B and Rosenbaum, E 1980 *The Roman cookery book, a critical translation of the art of cooking by Apicius, for use in the study and kitchen* (London: Harrap)
- Folkerts, M 2008 'Balbus (Balbus Mensor[?])', in *Complete Dictionary of Scientific Biography*, <http://www.encyclopedia.com/doc/1G2-2830900242.html>
- Forbes, R J 1966 *Studies in ancient technology 6: Heat and heating, refrigeration, light* (Leiden: Brill)
- Forster, E S and Heffner, E H (trans) 1979 *Columella: On Agriculture, Volume III* (Cambridge, Mass: Loeb Classical Library)
- Foss, P W 1994 *Kitchens and dining rooms at Pompeii: the spatial and social relationship of cooking and eating in the Roman household*, https://quemdixerechaos.files.wordpress.com/2012/11/kitchensdiningpompeii_foss.pdf, accessed 17/7/2015
- Foucher, L 1994 'Diana-Nemesis, patronne de l' Amphithéâtre, in Romano-British mosaics' in Johnson, P, Ling, R and Smith, D J (eds), *Fifth International Colloquium on Ancient Mosaics*, J Roman Archaeol Supp Ser, **9**, 229–37
- Fowler, P J 1983 *The Farming of Prehistoric Britain* (Cambridge: Cambridge University Press)
- Fox, A 1940 'The legionary fortress at Caerleon, Monmouthshire: excavations in Myrtle Cottage orchard, 1939', *Archaeol Cambrensis*, **19 Pt 2**, 101–52
- Foy, D and Fontaine, D 2008 'Diversité et évolution du vitrage de l'antiquité et du haut moyen age, un état de question', *Gallia*, **65**, 405–459
- Freeman, S P H T, Cook, G T, Dougans, A B, Naysmith, P, Wicken, K M, and Xu, S, 2010 'Improved SSAMS performance', *Nucl Inst Meth B*, **268**, 715–7
- Frere, S S, Roxan, M and Tomlin, R S O (eds) 1990 *The Roman Inscriptions of Britain*, II, Fasc 1, (Stroud: Haverfield Bequest)
- Frere, S S and Tomlin, R S O (eds) 1991 *The Roman Inscriptions of Britain*, II, Fasc 2, (Stroud: Haverfield Bequest)
- Frere, S S and Tomlin, R S O (eds) 1992 *The Roman Inscriptions of Britain*, II, Fasc 4, (Stroud: Haverfield Bequest)

- Frere, S S and Tomlin, R S O (eds) 1994 *The Roman Inscriptions of Britain*, **II**, Fasc 6, (Stroud: Haverfield Bequest)
- Frere, S S and Wilkes, J J 1989 *Strageath, excavations within the Roman fort 1973–86*, *Britannia Monogr*, **9** (London: Roman Soc)
- Froese, R and Pauly, D (eds) 2016 *FishBase. World wide web electronic publication* www.fishbase.org. Version 01/2016 25
- Fryer, V, 2007 'Charred plant macrofossils' in Germany, M (ed) *Neolithic and Bronze Age Monuments and Middle Iron Age settlement at Lodge Farm, St Osyth, Essex: Excavations 2000–3*. *East Anglian Archaeology*, **117**, 90–4
- Fulford, M 1989 *The Silchester Amphitheatre: excavations of 1979–85*, *Britannia Monogr Ser* **10** (London: Roman Society)
- Fulford, M 2007 'Coasting Britannia: Roman trade and traffic around the shores of Britain', in Gosden, C, Hamerow, H, de Jersey, P and Lock, G (eds), *Communities and Connections: Essays in Honour of Barry Cunliffe* (Oxford: Oxford University Press), 55–74
- Fulford, M and Durham, E (eds) 2013 *Seeing Red. New economic and social perspectives on Gallo-Roman terra sigillata*, *Bull Inst Class Studs Supplement*, **102** (London: University of London)
- Fulford, M and Timby, J 1989 'Tile and brick', in Fulford 1989, 142–6
- Fulford, M G and Timby, J 2001 'Timing devices, fermentation vessels, 'ritual' piercings? A consideration of deliberately 'holed' pots from Silchester and elsewhere', *Britannia*, **32**, 293–97
- Gale, D 1990 'Prehistoric stone mining tools from Alderley Edge', in Crew, P and S (eds), *Early mining in the British Isles*, Snowdonia National Park Study Centre Occasional Paper 1 (Blaenau Ffestiniog: Plas Tan y Bwlch), 4–8
- Gale, F 1991 'The Iron Age', in Manley, J, Greuter, S, and Gale, F (eds), *The Archaeology of Clwyd*, 82–96 (Clwyd County Council)
- Gale, R and Cutler, D F 2000 *Plants and Archaeology: Identification manual of vegetative plant materials used in Europe and the Mediterranean to c 1500* (Oxford: Westbury Publishing and the Royal Botanic Gardens, Kew)
- Garmonsway, G N (trans) 1960 *The Anglo-Saxon Chronicle* (London: J M Dent)
- [Garner, D 2001 *Report on an archaeological excavation and watching brief at Dee House, Chester*; unpublished report, Gifford and Partners Ltd (Rep B2159C/D.01)]
- Garner, D J, 2007a *The Neolithic and Bronze Age Settlement at Oversley Farm, Styal, Cheshire. Excavations in Advance of Manchester Airport's Second Runway 1997–8*, *Gifford Archaeol Monogr* 1: *BAR Brit Ser*, **435** (Oxford: Archaeopress)
- Garner, D 2007b *Archaeology in the Park* (Chester: Chester City Council)
- Garner, D 2008 *Excavations at Chester. 25 Bridge Street 2001: Two thousand years of urban life in microcosm*, *Archaeol Service Excav and Survey Rep*, **14** (Chester: Chester City Council)
- Garner, D J 2012 *Hillforts of the Cheshire Sandstone Ridge* (Chester: Cheshire West and Chester Council)
- Garner, D et al 2016 *Hillforts of the Cheshire Ridge: Investigations Undertaken by the Habitats and Hillforts Landscape Partnership Scheme 2009–2012* (Oxford: Archaeopress)
- Garner, D and Wilmott, T, 2007 'Let the Games Begin' *British Archaeology*, March/April 2007, 10–15
- Gem, R 2000 'Romanesque Architecture in Chester c. 1075–1117', in Thacker, A (ed), *Medieval Archaeology, Art, and Architecture at Chester*, 38–41 (London: BAA)
- Giard, J-B 1998 *Monnaies de l'Empire Romain*, vol. 3 (*AD 68 to Nerva*) (Paris), 69
- Gibbard, P L 1986 'Flint Gravels in the Quaternary of Southeast England', in Sieveking, G De C and Hart M B (eds) *The Scientific Study of Flint and Chert* (Cambridge: Cambridge University Press), 141–149
- Gibson, J P and Simpson, F G 1911 'The Milecastle on the Wall of Hadrian at the Poltross Burn', *Trans Cumberland Westmorland Antiq Archaeol Soc*, n ser, **11**, 390–461
- Gilbert, B M, Martin, L D and Savage, H G 1981 *Avian Osteology* (Laramie, WY: Modern Printing Co)
- Gillam, J P 1968 *Types of Roman coarse pottery vessels in northern Britain* (Newcastle-upon-Tyne: Oriel Press)
- Gillam, J P 1976 'Coarse fumed ware in northern Britain and beyond', *Glasgow Archaeol J*, **4**, 57–80
- Gillam, J P, Harrison, R M and Newman, T G 1973 'Interim report on the excavations at Rudchester 1972', *Archeol Aeliana*, 5 ser, **1**, 81–5
- Glastra, R 1980 *Osteologische Determinatie de Inheemse Herpetofauna* (Amsterdam: I.P.P.)
- Godwin, H 1975 *History of the British flora; a factual basis for phytogeography* (Cambridge: Cambridge University Press)
- Golvin, J-CI 1988, *L'Amphithéâtre Romain* (Paris: Bocard)
- Gomez-Pantoja, J L 2009 *Epigrafia Anfiteatral de Dell'Occidente Romano VII, Baetica, Tarraconensis, Lusitania, Vetera*, **17** (Roma: Edizione Quasar)
- Goold, G F (rev) 1979 *Ovid: Art of Love and other Poems* (Cambridge, Mass: Loeb Classical Library)
- Goold, G F (rev) 1989 *Catullus, Tibullus, Pervigilium Veneris* (Cambridge, Mass: Loeb Classical Library)
- Grant, A 1989 'Animals in Roman Britain', in 'Todd, M (ed.), *Research on Roman Britain 1960–89*, *Britannia Monogr Ser*, **11**, 135–46 (London: Roman Society)
- Gratuze, B 2007 *Etude de la composition des verres mosaïqués d'Avenche dans le cadre du programme 'Verres mosaïqués: étude des compositions du IIe s. Av. J-C au IV e s. Apr J-C' mené par M-D Nenna et B Gratuze* (Unpublished report, IRAMAT, Orleans)
- Green, F 1981 'The botanical remains' in Davies, S M, 'Excavation at Old Down Farm, Andover. Part II: Prehistoric and Roman', *Proc Hampshire Field Club and Archaeol Soc*, **37**, 81–163
- Green, H S 1980 *The Flint Arrowheads of the British Isles: a detailed study of material from England and Wales with comparanda from Scotland and Ireland: Part I*, *BAR Brit Ser*, **75** (Oxford: Brit Archaeol Reps)
- Greene, K T 1977 'Legionary pottery and the significance of Holt' in Dore, J and Greene, K (eds), *Roman pottery studies in Britain and beyond*, *BAR Int Ser*, **30**, 113–32
- Greene, K T 1978 'Imported fine wares in Britain to AD 250: a guide to identification' in Arthur, P and Marsh, G (eds), *Early fine wares in Roman Britain*, *BAR Brit Ser*, **57** (Oxford: Brit Archaeol Reps), 15–30
- Greene, K T 1979 *Report on the excavations at Usk 1965–1976: the pre-Flavian fine wares* (Cardiff: University of Wales Press)
- Greene, K T 2007 'Review of F Seeley and J Drummond-Murray, *Roman pottery production in the Walbrook valley: excavations at 20–28 Moorgate, City of London, 1998–2000*', *Antiquity*, **81**, 489–90

- Greep, S 1991 'Objects of bone and antler' in Holbrook and Bidwell 1991, 266–7
- Greig, J 1999 'Pollen analysis', in LeQuesne 1999, 75–76
- Grew, F and Frere, S S 1989 'The objects of metal', in Frere 1989, 141–174
- Grimes, W F 1930 'Holt, Denbighshire: the works depot of the Twentieth Legion at Castle Lyons'. *Y Cymmrodor* **41** (London: Hon Soc Cymmrodorion)
- Grocock, C and Grainger, S 2006 *Apicius. A critical edition with an introduction and English translation* (Devon: Prospect)
- [GSB Prospection, 2002 *Chester Amphitheatre, Cheshire*, Geophysical Survey Report **2002/09**]
- Guiraud, H 1988 *Intailles et camées de l'époque romaine en Gaule, I* (Paris)
- Guiraud, H 1989 '*Bagues et anneau à l'époque romaine en Gaule*', *Gallia* **46**, 173–211
- Guiraud, H 1995 '*Intailles de Lons-Le-Saunier*', *Gallia*, **52**, 359–406
- Guiraud, H 2008 *Intailles et camées de l'époque romaine en Gaule, II* (Paris)
- Gummere, R (trans) 1917 *Seneca: Epistles vol 1* (Cambridge, Mass: Loeb Classical Library)
- Guzzo, P G (ed) 2003 *Tales from an Eruption Pompeii. Herculaneum Oplontis Guide to the exhibition* (Milan: Electra)
- Häfliger, E and Brun-Hool, J 1968–177 *Ciba-Geigy Weed Tables*, A synoptic presentation of the flora accompanying agricultural crops. (Basle: Documenta Ciba-Geigy)
- [Halcrow Group Ltd 2013 *North West Estuaries Processes Reports: Dee Estuary*, Unpublished report prepared for Sefton Council, available from http://www.liv.ac.uk/~cmi/dee/Dee_rep2013.pdf]
- [Hall, A 2003 Recognition and Characterisation of Turves in Archaeological Occupation Deposits by means of Macrofossil Plant remains. Centre for Archaeology Report 16/2003]
- Hall, A R and Huntley J P 2007 *A Review of the Evidence for Macrofossil Plant Remains from Archaeological Deposits in Northern England*, English Heritage Research Report 87/2007
- Hall, A R and Kenward, H K 1990 *Environmental evidence from the Colonia: General Accident and Rougier Street*, The archaeology of York Vol 14 Fasc 6, York Archaeological Trust. (York: CBA)
- Hall, A R, Kenward, H K, and Williams D 1980 *Environmental evidence from Roman deposits in Skeldergate*, The archaeology of York Vol 14 Fasc 3, York Archaeological Trust. (York: CBA)
- Hall, A and Kenward, H 2005 *Technical Report: plant and invertebrate remains from Iron Age deposits at Sutton Common, South Yorkshire (site code SCOM02–03). Part I. Text and Publication Tables*, Reports from the Centre for Human Palaeoecology, University of York, **2005/10**
- Halliday, S P 1987 'Cord rig and early cultivation in the Borders', *Proc Soc Antiq Scot*, 116, 584–5
- Halliday, S P 1993 'Marginal agriculture in Scotland', in Smout, T C (ed) *Scotland since prehistory: natural change and human impact* (Edinburgh: Scottish Natural Heritage), 64–78
- Halliday, S P 2001 'Rig and Furrow in Scotland', in Barber, J (ed), *Guidelines for the Preservation of Areas of Rig and Furrow in Scotland*, (Edinburgh: Scot Trust Archaeol Res), 9–11
- Halliday, S P, Hill, P J and Stevenson, J B 1981 'Early agriculture in Scotland' in R Mercer (ed) *Farming Practice in British Prehistory* (Edinburgh: Edinburgh University Press), 55–65
- Hallier, G 1990, 'La géométrie des amphithéâtres militaires sur les limes du Rhin et du Danube', *Akten des. 14. Internationalen Limeskongresses in Carnuntum* (Vienna 1986) (Vienna: Austrian Academy of Sciences), 71–82.
- Halstead, P 1985 'A study of mandibular teeth from Romano-British contexts at Maxey' in Pryor, F and French, C, *Archaeology and environment in the Lower Welland Valley*, East Anglian Archaeology, **27** (Cambridge: EAA), 219–24
- Hamburger, A 1968 *Gems from Caesarea Maritima* (Jerusalem)
- Hamilton-Dyer, S 2008 'Fish bone from selected contexts', in Trevarthen, M, *Suburban life in Roman Durnovaria: Excavations at the Former County Hospital Site, Dorchester; Dorset 2000–2001* (Salisbury: Trust for Wessex Archaeology). Specialist report available from http://www.wessexarch.co.uk/files/projects/dorchester_county_hospital/06_Fish_bones.pdf
- Hanson, W S 1972 'The kiln group' in Jones 1972, 50–53
- Hanson, W S 2007 Elginhaugh: a Flavian fort and its annexe, *Britannia Monog*, **23** (London: Roman Soc)
- Hanson, W S and Maxwell, G S 1983 *Rome's North West Frontier: the Antonine Wall* (Edinburgh: Edinburgh University Press)
- Harding, D W, 2009 *The Iron Age Round-House. Later Prehistoric Building in Britain and Beyond*. (Oxford: Oxford University Press)
- Harland, J F, Barrett, J, Carrott, J, Dobney, K and Jaques, D 2003 'The York System: An integrated zooarchaeological database for research and teaching', *Internet Archaeology* **13**
- Harrison, L A 1995 'Animal bone', in Matthews, K J, *Excavations at Chester: The Evolution in the Heart of the City, Investigations at 3–15 Eastgate Street 1990/1*, Chester Archaeology excavation and survey report, 8, (Chester: Chester City Council), 50–55
- Hartley, B R nd (distributed 2010) The Brian Hartley archive collection of samian rubbings from UK excavations; set of 4 DVDs (Wellington: The Study Group for Roman Pottery)
- Hartley, B R and Dickinson, B M 2008 *Names on terra sigillata. An index of makers' stamps and signatures on Gallo-Roman terra sigillata (samian ware)*, volumes 1–9, Bull Inst Classical Stud Suppl, **102–01** to **102–09** (London: University of London)
- Hartley, B R and Morris, J 1976 'Samian ware', in Thompson 1976, 202–7
- Hartley, B R and Kaine, K F 1954 'Roman dock and buildings', *J Chester Archaeol Soc*, **41**, 15–37
- Hartley, B R, Pengelly, H and Dickinson, B M 1994 'Samian ware', in Cracknell, S and Mahany, C, (eds), *Roman Alcester: Southern Extramural Area 1964–1966 Excavations part 2: Finds and Discussion*, CBA Res Rep, **97** (York: CBA), 93–119.
- Hartley, K F 1973 'The marketing and distribution of mortaria' in Detsicas, A (ed) *Current research in Romano-British pottery*, CBA Res Rep **10** (London: CBA)
- Hartley, K F and Tomber, R with Webster, P V 2006 *A mortarium bibliography for Roman Britain*, *J Roman Pottery Studies* **13** (Oxford: Oxbow Books)
- Hartley, K F and Webster, P V 1973 'Romano-British pottery kilns near Wilderspool', *Archaeol J*, **130**, 77–103
- Haselgrove, C 1982 'Wealth, prestige and power: the dynamics of Iron Age political centralization in south-east England', in Renfrew, C and Shennan, S (eds) *Ranking, Resource and Exchange*, (Cambridge: Cambridge University Press), 79–88
- Haselgrove, C and Moore, T (eds) 2007 *The later Iron Age in Britain and beyond*. (Oxford, Oxbow books)
- Haselgrove, C and Pope, R (eds) 2007 *The earlier Iron Age in Britain and the near Continent*. (Oxford, Oxbow books)

- Haselgrove, C, Armit, I, Champion, T *et al* 2001 Understanding the British Iron Age: an agenda for action. (Salisbury: Prehistoric Society Wessex Archaeology)
- Hattatt, R 1982 *Iron Age and Romano-British brooches* (Sherborne: Dorset Publishing)
- Hattatt, R 1985 *Iron Age and Roman brooches* (Oxford: Oxbow Books)
- Hebblethwaite, S M 1987 'Physique and geology' in B E Harris and A T Thacker (eds) *Victoria County History of the County of Chester*, **1**, (London: Institute of Historical Research), 1–35
- Heke, A 2012a 'The Roman ceramic building materials', in Cuttler *et al* 2012, 71–86
- Heke, A 2012b 'Nicholas Street Mews 1988/Building materials/Plaster', in Ward, S *et al* 2012, 101–7
- Heke, A 2014 'Portable ovens from Chester', *Study Group for Roman Pottery Newsl*, **57**, 9–13
- Heke, A and Smith, I 2009 'Amphitheatre news', *The Past Uncovered*. Chester Archaeology, Design and Conservation News, Chester City Council, **4**
- Heke, A 2017 *The Roman building materials from excavations at Chester's Roman amphitheatre*, Historic England Research Report, **71/2017** (Portsmouth: Historic England)
- Heke, A and Ward, M 2012a 'Ceramic building material and pottery methodologies', in Ward, S *et al* 2012, 3–12
- Heke, A and Ward, M 2012b 'Portable artefacts: Pottery', in Ward, S *et al* 2012, 107–132
- Hemsley, R 1959 'A Romano-British pottery kiln at Manduessedum', *Trans Birmingham Archaeol Soc*, **77**, 5–17
- Henig, M 1994 *Classical Gems. Ancient and Modern Intaglios and Cameos in the Fitzwilliam Museum, Cambridge* (Cambridge: Cambridge University Press)
- Henig, M 2007a *A corpus of Roman engraved gemstones from British sites*, BAR Brit Ser **8** (3rd edn) (Oxford: Archaeopress)
- Henig, M 2007b 'The Intaglio', in Hanson 2007, 443
- Henson, D and Hurcombe, L 1993 'The non-flint lithic finds', in Ellis, P 1993, 59–61
- Herepath, N and Carrington, P 2005 'Portable antiquities in the north-west; coins on rural sites', *Lucerna*, **30**, 13–14
- Hermet, F 1934 *La Graufesenque (Condatomago)*, (Paris: Librairie Ernest Leroux)
- Higham, N J 1993 *The Origins of Cheshire* (Manchester: Manchester University Press)
- Higham, N J and Cane, T 1999 'The Tatton Park Project, Part 1: Prehistoric to Sub-Roman', *J Chester Archaeol Soc*, **74**, 1–62
- Hill, J D 2007 'The dynamics of social change in Later Iron Age eastern and south-eastern England c 300 BC – AD 43' in Haselgrove and Moore (eds) 2007, 16–40
- Hill, P R 1981 Stonework and the Archaeologist: including a stonemason's view of Hadrian's Wall, *Archaeol Aeliana*, ser **5**, **9**, 1–22
- Hill, P V 1970 *The Dating and Arrangement of the Undated Coins of Rome, AD 98–148*, (London: Spink and Son)
- Hill, P V, Carson, R A G and Kent, J P C, 1960 *Late Roman Bronze coinage, AD 324–498* (London: Spink and Son)
- Hillman, G C 1981 'Reconstructing crop husbandry practices from charred remains of crops' in Mercer, R J (ed) *Farming Practice in British Prehistory* (Edinburgh: Edinburgh University Press), 123–62
- Hillman, G 1984 Interpretation of archaeological plant remains: The application of ethnographic models from Turkey, in W Van Zeit and W A Casparie (eds) *Plants and Ancient Man*, Studies in palaeoethnobotany, Proceedings of the sixth symposium of the International Work Group for Palaeoethnobotany, Groningen (1983) (Rotterdam: AA Balkema), 1–41
- Hinchliffe, J and Williams, J H 1992 *Roman Warrington. Excavations at Wilderspool 1966–9 and 1976*, Brigantia Monograph, **2** (Manchester: University of Manchester)
- Hind, D 1998 Chert Use in the Mesolithic. *Assemblage* 4: <http://www.assemblage.group.shef.ac.uk/4/4hind.html>
- Hobley, A S 1989 'The Numismatic Evidence for the Post-Agricolan Abandonment of the Roman Frontier in Northern Scotland', *Britannia*, **20**, 69–74
- Hodgson, J and Brennand, M 2006 'Chapter 2: Prehistoric Period Resource Assessment', in Brennand, M (ed), *An Archaeological Research Framework for the North West Region. Volume 1: Resource Assessment*, Archaeology North West, **8**, 23–58
- Hodgson, J and Brennand, M 2007 'Chapter 2: The Prehistoric Period Research Agenda', in Brennand, M (ed) *An Archaeological Research Framework for the North West Region. Volume 2: Research Agenda and Strategy*, Archaeology North West, **9**, 31–54
- Hodgson, N, Stobbs, G and van der Veen, M 2001 'An Iron Age settlement and remains of earlier prehistoric date beneath South Shields Roman fort', *Archaeol J*, **158**, 62–161
- Hofmann, B 1988 *L'atelier de Banassac. Gonfaron: Revue archéologique*, SITES Hors Série, **33**
- Holbrook, N and Bidwell, P T 1991 *Roman Finds from Exeter*, Exeter Archaeol Rep **4**, (Exeter: Exeter City Council and University)
- Holbrook, N and van der Veen, M 1995 'Radiocarbon dates from the settlement at Chester House, Northumberland', *Archaeol Aeliana*, 5th Ser, **23**, 314–17
- Holder, P A 1982 *The Roman Army in Britain* (London: Batsford)
- Holleran, C 2012 'Shopping with the Romans', *BBC History*, **13**, 28–30
- Hopkins, K 1983 'Murderous games', in Hopkins, K, *Death and renewal; sociological studies in Roman history*, vol **2** (Cambridge: Cambridge University Press), 1–30
- Hopkins, K and Beard, M 2005 *The Colosseum* (London: Profile)
- Hornum, N B 1993 *Nemesis, the Roman State and the Games* (Leiden: Brill)
- Housley, R A, Walker, A J, Otlet, R L, Hedges, R E M 1995 'Radiocarbon dating of the Lindow III body' in Turner, R C and Scaife, R G, *Bog bodies: new discoveries and new perspectives* (London: British Museum), 39–46
- Howard-Davis, C 2000 'Copper alloy', in Buxton and Howard-Davis 2000, 242–61
- Howard Davis, C and Whitworth, A 2000 'Ironwork', in Buxton, K and Howard-Davis 2000, 261–275
- Howard-Davis, C 2009 *The Carlisle Millennium Project. Excavations in Carlisle, 1998–2001. Volume 2: the finds*, Lancaster Imprints, **15** (Lancaster: Oxford Archaeol)
- Hufschmid, T 2007 *Amphitheatrum in Provincia et Italia: Architektur und Nutzung römischer Amphitheater von Augusta Raurica bis Puteoli*, Forschungen in August, **43**, (Basel: Augusta Raurica)
- Hufschmid, T 2009 'Theatres and amphitheatres in Augusta Raurica, August, Switzerland', in Wilmott, T (ed) 2009a, 105–117
- [Hughes, J 2008 *Worcester library and history centre: community excavations and public programme at The Butts, Worcester*

- *August to October 2008*, Historic Environment and Archaeology Service Worcestershire County Council Rep **1701]**
- Huld-Zetsche, I 1993 *Trierer Reliefsigillata Werkstatt II, Materialien zur römisch-germanischen Keramik*, **12** (Bonn: Habelt)
- Humer, F, Boulasikis, D and Konecny, A (eds) 2016 *Das Amphitheater des Lagerstadt Carnuntum* (Vienna: Römerstadt Carnuntum)
- [Hunter-Mann, K 2001 *Ceramic building materials. Minimum standards for recovery, curation, analysis and publication*, Archaeological Ceramic Building Materials Group draft document]
- Independent Cinema Office 2016 www.independentcinemaoffice.org.uk/resources/how-to-start-a-local-cinema/building-design
- Jackson, C M and Cottam, S 2015 'A green thought in a green shade; compositional and typological observations concerning the production of emerald green glass vessels in the 1st century AD', *J Archaeol Sci*, **61**, 139–48
- Jackson, C M and Paynter, S 2015 'A great big melting pot: exploring patterns of glass supply, consumption and recycling in Roman Coppergate, York', *Archaeometry*, Doi 10.1111/arc.12158
- Jackson, R 1983 'The Chester gladiator rediscovered', *Britannia*, **14**, 87–95
- Jacobelli, L 2003 *Gladiators at Pompeii* (Los Angeles: Getty)
- Jacobi, R M 1978 'Northern England in the Eighth Millennium bc: an essay', in Mellars, P (Ed) *The Early Postglacial Settlement of Northern Europe* (London: Duckworth), 295–332
- Jacobi, R M, Tallis, J H and Mellars, P A 1976 'The Southern Pennine Mesolithic and the Ecological Record', *J Archaeol Sci*, **3**, 307–320.
- Jacobs, J 1913 *Sigillatafunde aus einem römischen Keller zu Bregenz, Jahrb für Altertumskunde*, **6**, 172–84
- James, S 2004 *Excavations at Dura-Europos 1928–1937, Final Report VII, The Arms and Armour and other Military Equipment* (London: British Museum Press)
- Jagues, D, Hall, A, Kenward, H, Carrott, J 2004 *Technical report: plant, invertebrate and fish remains from excavations at 25 Bridge Street, Chester (site code: CHE/25BS'01)*, Palaeoecology Research Services unpublished report 2004/46
- Jagues, D, Hall, A, Kenward, H, Carrott, J 2008 'Plant, Invertebrate and Fish Remains', in Garner 2008, 381–406.
- JCAS 1936 Report of the Council for the years 1933, 1934 and 1935. *J Chester Archaeol Soc*, N ser, **31** (2), 122–5
- JCAS 1940 Report of the Council for the year 1939. *J Chester Archaeol Soc*, N ser **34** (2), 161–4
- Jennison, G 1937 *Animals for Show and Pleasure in Ancient Rome*, (Manchester: Manchester University Press)
- Johnstone, J, 1910 'The fishes of Cheshire and Liverpool Bay', in Coward, TA (ed) *The Vertebrate Fauna of Cheshire and Liverpool Bay, Volume 2* (London: Witherby and Co), 17–166. Available from <http://www.biodiversitylibrary.org/item/109714#page/69/mode/1up>
- Jones, A 2008a 'Roman building materials', in Garner 2008, 127–44
- Jones, A 2008b 'Roman pottery: Fine and coarse wares', in Garner 2008, 167–86
- Jones, A K G 1988 *Fish bones from excavations in the cemetery of St Mary Bishopshill Junior*, The archaeology of York Vol 15 Fasc 2, York Archaeological Trust. (York: CBA), 126–30
- [Jones, A K G 2001 'The fish remains' in Garner, D 2001, 17–18]
- Jones, G, Bogaard, A, Charles, M and Hodgson, JG 1999 'Identifying the intensity of crop husbandry practices on the basis of weed floras', *Annual of the British School at Athens*, **94**, 167–89
- Jones, G and Moss, R 1993 'The charred plant remains from prehistoric contexts', in Ellis, P (ed) *Beeston Castle, Cheshire, a report on the excavations 1968–85 by Laurence Keen and Peter Hough*. English Heritage archaeological Rep. 23, 80–3 and Fiche M1:F1–M22:E4
- Jones, G D B 1972 'Excavations at Northwich (Condate)', *Archaeol J*, **128**, 31–77
- Kanz, F and Großschmidt, K 2009 'Dying in the arens: the osseous evidence from Ephesian gladiators' in Wilmott 2009a, 211–20
- Karatasios, I, Alexiou, K, Müller, N S, Day, P and Kilikoglou, V 2014 'The second life of ceramics: a new home in a lime environment', in M Martínón-Torres (ed), *Craft and science: International perspectives on archaeological ceramics* (Bloomsbury: Qatar Foundation), 271–9
- Karnitsch, P 1959 *Die Reliefsigillata von Ovilava (Wels, Oberösterreich)*. Linz: Institut für Landeskunde von Oberösterreich (Schriftenreihe **12**)
- Keay, S J 1984 *Late Roman amphorae in the western Mediterranean. A typology and economic study: the Catalan evidence*, BAR Int Ser **196** part (i) (Oxford: Brit Archaeol Reps)
- Kent, J P C 1976 'Coins from the 1960–69 excavations: stratified', in Thompson (1976), 188–9
- Kenyon, K M 1935 'The Roman theatre at Verulamium, St Albans', *Archaeologia*, **84**, 213–61
- Kenyon, K M 1948 *Excavations at the Jewry Wall site, Leicester*, Rep Res Comm Soc Antiqs London, **15** (Oxford: Soc Antiqs London)
- Kerridge, E 1967 *The Agricultural Revolution* (London: Allen and Unwin)
- King, A C 1978 'A comparative survey of bone assemblages from Roman sites in Britain'. *Institute of Archaeology Bulletin*, **15**, 207–32
- King, A C 1998 'Bryn Eryr; the Roman pottery: a note on Central Gaulish samian', in Longley, D, Johnston, N, Evans, J and others, 'Excavations on two farms of the Romano-British period at Bryn Eryr and Bush Farm, Gwynedd', *Britannia*, **29**, 212–3
- Kingery, W D and McCray, P (eds) 1998 *The prehistory and history of glassmaking technology, ceramics and civilization*, Ceramics and Civilization ser, **8** (Ohio: American Ceramic Soc)
- Kinory, J 2012 *Salt Production, Distribution and Use in the British Iron Age*, Oxford. BAR Brit Ser, **559** (Oxford: Archaeopress)
- Knorr, R 1905 *Die verzierten Terra sigillata-Gefäße von Cannstatt und Köngen-Grinario*, (Stuttgart: W Kohlhammer)
- Knorr, R 1910 *Die verzierten Terra-Sigillata-Gefäße von Rottenburg-Sumolocenna*, (Stuttgart: W Kohlhammer)
- Knorr, R 1912 *Südgallische Terra-Sigillata-Gefäße von Rottweil*, (Stuttgart: W Kohlhammer)
- Knorr, R 1919 *Töpfer und Fabriken verzierter Terra-Sigillata des ersten Jahrhunderts*, (Stuttgart: W Kohlhammer)
- Knorr, R 1952 *Terra-Sigillata-Gefäße des ersten Jahrhunderts mit Töpfernamen*, (Stuttgart: W Kohlhammer)
- Kretzschmer, F and Heinsius, E 1951 *Über einige Darstellungen altrömischen Rechenbretter*. *Trierer Zeitschrift*, **20**, 96–108

- Kuhnen, H-P 2007 'The Trier amphitheatre; an ancient monument in the light of new research', in Wilmott (ed) 2009a, 95–103, pl 31
- Laegsmand, K 1968 'The ard-head from Mors', *Tools and Tillage*, 1, 60–1
- Laughton, J 2008 *Life in a Late Medieval City: Chester 1275–1520* (Oxford: Oxbow Books)
- Lauwerier, R C G M 1988 'Animals in Roman Times in the Dutch Eastern River Area'. *ROB Neaderlannse Oudheden*, 12
- Leach, G B 1942 'Some surface finds of prehistoric and Roman periods from Ashton near Chester', *J Chester Archaeol Soc*, 35 part 1, 53–60
- Leah, M D, Wells, C E, Appleby, C and Huckerby, E 1997 *The Wetlands of Cheshire*. North West Wetlands Survey 4. (Lancaster: Lancaster Imprints)
- Leary, R 2008 'Coarse pottery', in Williams and Reid 2008 (Oxford: Archaeopress), 65–116
- Lemke, C 1998 'Reflections of the Roman Empire: the first century glass industry seen through traditions of manufacture', in Kingery and McCray (eds), 269–291
- Lentowicz, I J 2002 'Copper-alloy objects from Catterick Bypass and Catterick 1972 (sites 433 and 434)' Wilson 2002, 46–78
- Lequément, R (nd) *Fouilles à l'amphithéâtre de Tébessa (1965–1968)*, Supp Bull d'archéologie Algérienne, 2 (Algiers: Ministère de l'Information et de la Culture)
- Le Quesne, C 1999 *Excavations at Chester: The Roman and Later Defences, Part 1 – investigations 1978–1990*, Chester Archaeology Excavation and Survey Report, 11 (Chester: Chester City Council)
- Levy, H L 1941 'Catullus, 5, 7–11 and the abacus' *American J Philology*, 62 (2), 222–4
- Lewis, M J T 2001 *Surveying instruments of Greece and Rome* (Cambridge: Cambridge University Press)
- Lezine, A 1960, 'Notes sur l'amphithéâtre de Thrydsus', *Les Cahiers de Tunisie*, 9, 29–51
- Liddle, J 2008 'Animal bone', in Bateman *et al* 2008, 212–217
- Ling, R 1985 *Romano-British Wall Painting* (London: Shire)
- Ling, R 1989 'The wall plaster', in O'Leary, T J, Blockley, K and Musson, C, *Pentre Farm, Flint 1976–81: an official building in the Roman lead-mining district*, BAR Brit Ser 207 (Oxford: Brit Archaeol Reps), 88–90
- Lister, A 1996 'The Morphological Distinction between Bones and Teeth of Fallow Deer (*Dama dama*) and Red Deer (*Cervus elaphus*)', *Int J Osteoarchaeol*, 6, 119–43
- Liversidge, J 1976 'Woodwork', in Strong, D and Brown, D (eds) *Roman Crafts* (London: Duckworth), 155–165
- Liversidge, J 1983 'Wall painting from military sites in Roman Britain' in Barbet, A (ed), *La peinture murale romaine dans les provinces de l'Empire: Journées d'étude de Paris 23–25 septembre 1982*, BAR Int Ser, 165 (Oxford: Brit Archaeol Rep), 141–56
- Lloyd-Morgan, G 1997 'Objects of copper-alloy and silver', in Marvell and Owen-John 1997, 234–73
- Lloyd-Morgan, G 2012 'Copper alloy', in Ward, S *et al* 2012, 74–6
- Locker, A 1990 'The fish bones', in Neal, D, Wardle, A and Hunn, J, *Excavation of the Iron Age, Roman and Medieval Settlement at Gorhambury, St Albans*, English Heritage Archaeological Report 14 (London: English Heritage), 212
- Locker, A 2007 'In piscibus diversis; the Bone Evidence for Fish Consumption in Roman Britain', *Britannia*, 38, 141–180
- Longley, D M T 1987 'Prehistory', in Harris, B E and Thacker, A (eds) *A history of the county of Chester. Volume 1. Physique, Roman, Anglo-Saxon and Domesday* (Oxford: Oxford University Press) 36–39
- Lowther, A W G 1972 'Appendix G: The ventilator', in Johnson, D E, 'A Roman building at Chalk, near Gravesend', *Britannia*, 3, 146–7
- Lowther, A W G 1976 'Romano-British chimney pots and finials', *Antiq J*, 56, 35–48
- Lucus, A T 1960 *Furze – A survey and history of its uses in Ireland* (Dublin: National Museum of Ireland)
- Luley, B J 2014 'Cooking, class and colonial transformations in Roman Mediterranean France', *American J Archaeol*, 118 (1), 33–60
- Lyne, M 2003 'Some new coin types of Carausius and Allectus and the history of the British provinces AD 286–296', *Numis. Chron*, 163, 147–68
- Maaskant-Kleibrink, M 1978 *Catalogue of the Engraved Gems in the Royal Coin Cabinet, The Hague* (The Hague)
- McCobb, L M E, Briggs, D E G, Evershed, R P, Hall, A R, Hall R A 2001 'Preservation of fossil seeds from a 10th century AD cess pit at Coppergate, York', *J Archaeol Sci*, 28, 929–40
- [McComish, J M 2012 *An analysis of Roman ceramic building material from York and its immediate environs*, MA Thesis, University of York]
- MacGregor, A 1985 *Bone, antler, ivory and horn: the technology of skeletal materials since the Roman period* (London: Croom Helm)
- McPeake, J C, 1978 'The first century AD', in Strickland, T J and Davey, P J (eds), *New evidence for Roman Chester* (Liverpool: Liverpool University), 9–16
- McPeake, J C, Bulmer, M and Rutter, J A 1980 'Excavations in the garden of no 1, Abbey Green, Chester: interim report, 1975–77', *J Chester Archaeol Soc*, 63, 14–37
- Malone, S J, 2006 *Legio XX Valeria Victrix, prosopography, archaeology and history*, BAR Int Ser 1491 (Oxford: Archaeopress)
- Maltby, M 1997 'Domestic fowl on Romano-British sites: Inter-site comparisons of abundance', *Int J Osteoarchaeol*, 7, 402–414.
- Manley, J, Greuter S and Gale F 1991 *The Archaeology of Clwyd*. (Clwyd: Clwyd County Council)
- Manning, W H 1976 *Catalogue of Romano-British Ironwork in the Museum of Antiquities Newcastle Upon Tyne* (Newcastle upon Tyne: University of Newcastle upon Tyne)
- Manning, W H 1985 *Catalogue of the Romano-British Iron Tools, Fittings and Weapons in the British Museum* (London: British Museum Pubns Limited)
- Märkle, T and Rösch, M 2008 'Experiments on the effects of carbonization on some 773 cultivated plant seeds' *Vegetation History and Archaeobotany*, 17(0), 257–263
- Marr, B and Röring, N 2016 'Bauforschung am amphitheatre der lagerstadt Carnuntum', in Humer *et al* (eds) 2016, 112–133
- Marsh, G 1978 'Early second century fine wares in the London area', in Arthur, P and Marsh, G (eds) *Early fine wares in Roman Britain*, BAR Brit Ser, 57 (Oxford: Brit Archaeol Reps), 119–223
- Marsh, G 1981 'London's samian supply and its relationship to the Gallic samian industry', in Anderson, A C and Anderson, A S (eds), *Roman pottery research in Britain and north-west Europe*, BAR Brit Ser, 123 (i), (Oxford: Brit Archaeol Reps), 173–238

- Martin, T 1974 *Deux années de recherches archéologiques à Montans (Tarn)*, *Revue Archéologique du Centre* **13**, 123–43
- Martin, T 1986 'Montans', in Bémont and Jacob 1986, 58–71
- Marvell, A and Owen-John, H S 1997 *Leucarum: Excavations at the Roman auxiliary fort at Loughor, West Glamorgan 1982–84 and 1897–88*, *Britannia Monog*, **9** (London: Roman Soc)
- Marzano, A 2013 *Harvesting the Sea: The Exploitation of Marine Resources in the Roman Mediterranean* (Oxford: Oxford University Press)
- Mason, D J P 1976 'Chester; the evolution and adaptation of its landscape', *J Chester Archaeol Soc*, **59**, 14–23
- Mason, D J P 1987 'Chester: The *Canabae Legionis*', *Britannia*, **18**, 143–168
- [Mason, D J P 1989 'Excavations on the site of the former public library buildings, St John Street, 1988/9, Unpublished archive report, Chester Archaeology]
- Mason, D J P 2000a *Excavations at Chester: the elliptical building: an image of the Roman world?*, Chester Archaeology excavation and survey report, **12**, (Chester: Chester City Council)
- Mason, D J P 2000b 'Excavating Chester's amphitheatre', *Minerva*, **11/5**, 6–8
- Mason, D J P 2001 *Roman Chester: City of the Eagles* (Stroud: Tempus Publishing)
- Mason, D J P 2002 'The construction and operation of a legionary fortress' in Carrington, P (ed) *Deva Victrix: Roman Chester re-assessed* (Chester: Chester Archaeol Soc)
- Mason, D J P 2005 *Excavations at Chester: the Roman fortress baths – excavation and recording 1732–1998*, Chester Archaeology excavation and survey report, **13**, (Chester: Chester City Council)
- Mason, D J P 2007 *Chester, AD 400–1066; from Roman fortress to English town* (Stroud: Tempus)
- Mason, D J P 2012 *Roman Chester; fortress at the edge of the World* (Stroud: History Press)
- Mass, J L, Stone, R E and Wypyski, M T 1998 'The mineralogical and metallurgical origins of Roman opaque coloured glasses', in Kingery and McCray (eds), 121–44
- Matolcsi, J 1970 'Historische Erforschung der Körpergrösse des Rindes auf Grund von ungarischem Knochenmaterial', *Zeitschrift für Tierernährung und Zuchtungsbiologie* **87**, 89–137
- Matter, G 2011 'Die Amphitheatre von Vindonissa' in Matter, G, Zemp, I, Hänggi, J, Trumm, J, Frei-Stolba, R, Hänggi, R and Tschudin, W, *Das Amphitheater Vindonissa Brugg-Windisch* (Bern: *Schweizerische Kunstführer*), 8–13
- Matter, G 2016, *Von der, Berlisgruob' zum 3D-druck. Neue Erkenntnisse zum Befund und zur rekonstruktion des amphitheatres von Windisch/ Vindonissa, Kanton Aargau, Schweiz*, in Humer et al (eds) 2016, 47–64
- [Matthews, K J 2000a *Chester Amphitheatre: research agenda*, Draft report, Chester CC]
- Matthews, K J 2000b 'New excavations at Chester's amphitheatre', *Chester Antiquary*, 2000/2 (Autumn–Winter)
- Matthews, K J 2001a 'The Iron Age of North-west England: a socio-economic model', *Journal of the Chester Archaeological Society*, **76**, 1–51
- Matthews, K J 2001b 'Excavations at Chester Amphitheatre, May–July 2001', *Chester Antiquary*, 2001/2 (Autumn–Winter)
- Matthews, K J 2004 'Chester's amphitheatre after Rome: a centre for Christian worship', *Cheshire History*, **43**, 12–27
- Matthews, K J 2006 'Carden Park, <http://www.kmatthews.org.uk/carden/carden3.html>
- [Matthews, K J et al 2001c *Chester Amphitheatre: Investigations summer 2000*, Chester CC]
- [Matthews, K J et al 2002 *Chester Amphitheatre: Excavations May–July 2001 and May–July 2002*, Chester CC]
- [Matthews, K J et al 2003 *Chester Amphitheatre: Excavations 2000–2003*, uncompleted draft report, Chester CC]
- [Matthews, K J and Willshaw, E M 1995 *Heritage Assessment of Dee House and Environs, Chester*, Chester Archaeol Serv Evaluation Report, **40**]
- Mattingly H 1923–2007 *The Roman Imperial Coinage*, London (Revised editions of Volume 1 (C H V Sutherland) and the Flavian section of Volume 2 (I Carradice and T V Buttrey) were published respectively in 1984 and 2007)
- Mattingly H 1923 *Coins of the Roman Empire in the British Museum: I. Augustus to Vitellius* (London: British Museum)
- Mayer, A. 1990 'Fieldwalking in Cheshire', *Lithics* **11** 48–50
- Mees, A W 1995 *Modellsignierte Dekorationen auf südgalischer Terra Sigillata, Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg*, **54** (Stuttgart: Theiss)
- Mees, A 2012 'The portrait of the potter Calus: a potter priest at La Graufesenque?', in Bird (ed) 2012, 41–57
- Mees, A 2014 *Punzen gestempelter südgalischer Reliefsigillata aus den Werkstätten von La Graufesenque. Teil 1. Menschen – Götter- mythologische Figuren*, *Mainz Kataloge Vor- und Frühgeschichtlicher Altertümer* **45** (1)
- Mees, A The internet index of Banassac figure types. <http://www.rgzm.de/anadecom/punzenka.htm> <http://www.rgzm.de/anadecom/ovolos2.htm>, accessed 31/10/2017
- Midgley, J 2006 *Amphitheatre* (Chester: Chester City Council)
- Mikler, H 1997 *Die römischen Funde aus Bein im Landesmuseum Mainz. Monographies Instrumentum*, **1** (Montagnac)
- Miller, S N 1928 'The stamped tile' in Wheeler and Wheeler (1928) 159–60
- Millett, M 1982 'Distinguishing between the *pes Monetalis* and the *pes Drusianus*: some problems', *Britannia*, **13**, 315–20
- Mills, P 2013 'The supply and distribution of ceramic building material in Roman Britain', in Lavan, L (ed), *Local economies? Production and exchange of inland regions in late antiquity*, *Late Antique Archaeol*, **10**, 451–69
- Mommsen, T H 1883 *Corpus Inscriptionum Latinum vol X: inscriptions Bruttiorum, Lucaniae, Campaniae, Siciliae, Sardiniae Latinae*. (Berlin)
- Monaghan, J 1997 *Roman pottery from York*, The archaeology of York – The pottery Vol **16** Fasc **8**, York Archaeological Trust. (York: CBA)
- Monckton, A 2000 'Charred plant remains from an Iron Age settlement site at Drift East, Covert Farm, Crick, Northamptonshire', Leicester: University of Leicester Archaeological Services (ULAS), ULAS Report No. 2000/107. doi: 10.5284/1023724
- Monteil, G 2008 'The distribution and use of samian inkwells in London', in Clark, J (ed) *Londinium and beyond: essays on Roman London and its hinterland for Harvey Sheldon*, CBA Res Rep, **156** (York: CBA) 177–83
- Monteil, G 2013 'Samian plain vessels – a review of their development in the 2nd century AD', in Fulford and Durham (eds) 2013, 349–67
- Mook, W G 1986 Business meeting: recommendations/resolutions adopted by the twelfth International Radiocarbon Conference, *Radiocarbon*, **28**, 799

- Morgan, V and Morgan, P 2004 *Prehistoric Cheshire* (Ashbourne: Landmark Publishing)
- Morris, E L 1985 'Prehistoric Salt Distributions: Two Case Studies from Western Britain', *Bull Board Celtic Studies*, **32**, 336–379
- Morris, E L 1994 'Production and Distribution of Pottery and Salt in Iron Age Britain: a Review', *Proc Prehist Soc*, **60**, 371–393
- Morris, E L 2007 'Making magic: later prehistoric and early Roman salt production in the Lincolnshire fenland' in Haselgrove, C and Moore, T (eds), *The Later Iron Age in Britain and Beyond*, 430–43 (Oxford: Oxbow Books)
- Morris, E L 2010 'Cheshire Salt Containers', in Philpott and Adams, 122–4.
- Morris, G 1988 'The Animal Bone', in Ward, S (ed.) *Excavations at Chester: 12 Watergate Street 1985, Roman Headquarters Building to Medieval Row*, 24–25. (Chester: Chester City Council)
- Morris, M 1996 'The future of Chester's past, 1989–96' in Carrington, P (ed) 1996, 95–103
- Morris, M 1997 'The Prehistory of Carden Park', *Archaeology North-west; the bulletin of CBA Group 5*, **12**, 137
- Mould, Q 2010 'Military equipment', in Bennett, P, Riddler, I and Sparey-Green, C, *The Roman watermills and settlement at Ickham Kent*, Archaeol Canterbury, NS, **5** (Canterbury Archaeol Trust)
- Mulder-Hymans, N 2002 'Archaeology, experimental archaeology and ethnoarchaeology on bread ovens in Syria', *Civilisations [En ligne]*, **49**, mis en ligne le 01 juin 2005. <http://civilisations.revues.org/1470>, accessed 14/9/2013
- Mulder-Hymans, N 2014 'The Iron Age bread ovens in the kitchen of Khirbat al-Mudayna, Jordan', in van der Steen, E, Boertien, J and Mudher-Hymans, N (eds), *Exploring the narrative: Jerusalem and Jordan in the Bronze and Iron Ages. Papers in honour of Margreet Steiner* (London: Bloomsbury), 159–70
- Möldner, G 2013 'Stable isotopes and diet: Their contribution to Romano-British research', *Antiquity*, **87**, 137–149
- Müller, M 2008 'Das Amphitheater' in Müller, M, Schalles, JH-J, and Zieling, N, *Colonia Ulpia Traiana; Xanten und sein Umland in römischer Zeit*, Geschichte der Stadt Xanten, **1** (Mainz: Philip von Zabern), 362–72
- [Murphy, P 1977 *Early Agriculture and Environment on the Hampshire Chalklands c.800BC to 400 AD*, Unpublished MPhil thesis, University of Southampton]
- Murphy, P, Albarella, U, Germany, M and Locker, A 2000 'Production, imports and status. Biological remains from a Late Roman farm at Great Holts Farm, Boreham, Essex, UK', *Environmental Archaeol*, **5**, 35–48
- Musson, C R, Britnell, W J and Smith, A G 1991 *The Breiddin Hillfort: A later prehistoric settlement in the Welsh Marches* CBA Res Rep, **76** (York:CBA)
- Myers, A M 1987 'All Shot To Pieces? Inter-Assemblage Variability, Lithic Analysis and Mesolithic Assemblage "Types"; Some Preliminary Observations', in Brown, A G and Edmonds M R (eds) *Lithic Analysis and Later British Prehistory: some problems and approaches*, BAR Brit Ser, **162**, (Oxford: Brit Archaeol Reps), 137–153
- Myers, A M 1989 'Lithics, Risk and Change in the Mesolithic', in Brooks, I and Phillips, P (eds) *Breaking the Stony Silence: papers from the Sheffield Lithics Conference 1988*, BAR Brit Ser, **213**, (Oxford: Brit Archaeol Reps), 131–160
- Myers, A M 2006 'The Mesolithic', in Cooper, N J (ed), *The Archaeology of the East Midlands: an archaeological resource assessment and research agenda*, Leicester Archaeol Monogr, **13** (Leicester: University of Leicester), 51–68.
- Neils, J 2004 'Kitchen or cult? Women with mortars and pestles', in Keay, S and Moser, S (eds), *Greek art in view. Essays in honour of Brian Sparkes* (Oxford: Oxbow Books), 54–62
- Neufert, E, Neufert, P, Baiche, B and Walliman, N 2002 *Architect's Data*, 3rd edn (Oxford: Blackwell)
- Nevell, M 1999 'Iron-age and Romano-British rural settlement in north west England: theory, marginality and settlement', in Nevell, M (ed) 1999 *Living on the Edge of Empire: Models, Methodology & Marginality. Late-Prehistoric and Romano-British Rural Settlement in North-West England*. CBA North West, Field Archaeology Centre University of Manchester, and Chester Archaeology, Archaeology North West, **3**, 14–26
- Nevell, M and Roberts, J 2005 'Towards an understanding of the rural economy and society of the Iron Age and Romano-British Landscape of the Mersey Basin and Southern Pennines' in Nevell, M and Redhead, N (eds) *Mellor: Living on the Edge. A Regional Study of an Iron Age and Romano-British Upland Settlement*. Manchester Archaeological Monographs Volume 1.
- Newstead, R 1924 'Report on the excavations on the site of the Roman camp, at the Deanery Field, Chester', *Annals Archaeol Anthropol*, **11.2**, 59–86
- Newstead, R 1928a 'Records of archaeological finds at Chester', *J Chester Archaeol Soc*, NS, **27(2)**, 59–160
- Newstead, R 1928b 'Report on the excavations on the site of the Roman fortress, at the Deanery Field, Chester', *Annals Archaeol Anthropol*, **15.2**, 3–32
- Newstead, R 1939 'Records of archaeological finds', *J Chester Archaeol Soc*, **33**, 5–117
- Newstead, R 1948a 'Records of archaeological finds', *J Chester Archaeol Soc*, NS, **36 (2)**, 49–172
- Newstead, R 1948b 'The Roman amphitheatre, in Newstead 1948a, 99–105
- Newstead, R and Droop, J P 1931 'Excavations in the Deanery Field, Chester, 1928 part ii: the finds', *Annals Archaeol Anthropol*, **18 (3–4)**, 113–56
- Newstead, R and Droop, J P 1932a 'The Roman amphitheatre at Chester', *J Chester Archaeol Soc*, NS **29**, 5–40
- Newstead, R and Droop, J P 1932b 'The SE corner of the Roman fortress, Chester', *J Chester Archaeol Soc* **29**, 41–9
- Newstead, R and Droop, J P 1939 'Excavations at Chester, 1939: the Princess Street clearance area' *J Chester Archaeol Soc*, NS, **34 (1)**, 5–45
- Nicholls, R 1983 *The Wellcome Gems. A Fitzwilliam Museum Catalogue* (Cambridge)
- Nicholson, R 2012 'Specialist Report 16: Fish Remains', in Biddulph, E, Foreman, S, Stafford, E, Stansbie, D and Nicholson, R (ed) *London Gateway: Iron Age and Roman Salt Making in the Thames Estuary, Excavation at Stanford Wharf Nature Reserve, Essex* (Oxford: Oxford Archaeology), Supplementary report available from <https://library.thehumanjourney.net/909/>
- Nieto, J and Puig, A M 2001 *Excavacions arqueològiques subaquàtiques a Cala Culip. 3. Culip IV: la terra sigillata decorada*, Monografies del Centre d'Arqueologia Subaquàtica de Catalunya, **3** (Girona: Museu d'Arqueologia de Catalunya)
- O'Hare, G B 1995 'Mortar analysis in archaeology', *Inst Field Archaeol Buildings Spec Interest Group Newsl*, **7**, 5–6
- O'Sullivan, A 2004 'Place, memory and identity among estuarine

- fishing communities: interpreting the archaeology of early medieval fish weirs', *World Archaeol*, **35**, 449–468
- Oldenstein, J 1976 'Zur Ausrüstung römischer Auxiliareinheiten', *Bericht Römisch-Germanischen Komm*, **57**, 49–284
- Oldenstein, J 1977 *Zur Buntmetallverarbeitung in den Kastellen am obergermanischen und rätischen Limes*, *Bulletin des Musées Royaux d'art et d'histoire*, Brussels, 185–96
- Orton, C and Hughes, M 2013 *Pottery in archaeology* (2nd edn) (Cambridge: Cambridge University Press)
- Oswald, F 1936/37 *Index of figure-types on terra sigillata ('samian ware')*, *Annals Archaeol Anthropol*, suppl (Liverpool: University of Liverpool)
- Oswald, F, and Pryce, T D 1920 *An introduction to the study of terra sigillata*, (London: Longmans)
- Ottaway, P 1996 *Excavations and observations on the defences and adjacent sites, 1971–90*, *The Archaeology of York*, Vol 3, The Legionary Fortress, 3/3 (York: York Archaeological Trust)
- Pannuti, U 1983 *Museo Archeologico Nazionale di Napoli. Catalogo della Collezione Glittica I* (Rome)
- Parsons, P 2007 *City of the sharp-nosed fish: Greek lives in Roman Egypt* (London: Weidenfeld and Nicolson)
- Passelac, M and Vernhet, A 1993 *Céramique sigillée sud-gauloise*, in Py, M, (ed), *Dictionnaire des céramiques antiques (VIIe s. av. n. è.-VIIe s. de n. è.) en Méditerranée nord-occidentale* (Provence, Languedoc, Ampurdan), *Lattara* **6**, 569–80 <http://syslat.on-rev.com/DICOCER/d.lattara6.html>, accessed 31/10/2017
- Pasqualini, M, Thernot, H and Garcia, H 2010 *L'Amphithéâtre de Fréjus: archéologie et architecture reflète d'un monument*, Ausonius Editions, *Mémoires* **22** (Paris: Bocard)
- Paulas, J 2016 'Cooking and baking technology', in Irby, G I (ed) *A companion to science, technology and medicine in ancient Greece and Rome*, **2**, 570–086
- Payne, S 1973 'Kill off patterns in sheep and goats: the mandibles from Asvan Kale', *Anatolian Studies*, **23**, 281–303
- Payne, S 1985 'Morphological distinctions between the mandibular teeth of young sheep, *Ovis*, and goats, *Capra*', *J Archaeol Sci*, **12**, 139–147
- Payne, S 1987 'Reference codes for wear states in the mandibular cheek teeth of sheep and goats', *J Archaeol Sci*, **14**, 609–14
- Paynter, S and Schibille, N forthcoming 'The polychrome glass from Roman Chester', in Edwards, J and Edwards and Paynter (eds, forthcoming)
- Paynter, S, Kearns, T, Cool, H and Chenery, S 2015 'Roman coloured glass in the western provinces: the glass cakes and tesserae from West Clacton in England', *J Archaeol Sci*, **62**, 66–81
- Peacock, D P S 1977 'Pompeian red ware', in Peacock, D P S (ed), *Pottery and early commerce: characterisation and trade in Roman and later ceramics* (London: Academic Press), 147–62
- Peacock, D P S and Williams, D F 1986 *Amphorae and the Roman economy: an introductory guide* (New York: Longman)
- [Pearson, E 2001 'Palaeoenvironmental analysis' in Garner, D 2001, 18–21]
- Pearson, E 2008 'The charred plant remains' in Barber, A and Watts, M, 'Excavations at Saxon's Lode Farm, Ripple, 2001–2: Iron Age, Romano-British and Anglo-Saxon Rural Settlement in the Severn Valley', *Trans Worcs Archaeol Soc*, **21**, 63–68.
- Pearson, E and Robinson, M 1994 'Environmental evidence from the villa', in Williams, R J and Zeepvat, R J (eds) *Bancroft: A late Bronze Age/Iron Age settlement, Roman villa and temple mausoleum, Volume 2, Finds and Environmental Evidence*, Bucks Archaeol Soc Monogr ser, **7**, 565–584
- Pelling, R 2000 'The charred and mineralised plant remains', in Charles, B M, Parkinson A and Foreman, S (eds), 'A Bronze Age Ditch and Iron Age Settlement at Elms Farm, Humberstone, Leicester', *Trans Leics Archaeol Hist Soc*, **74**, 207–213
- Pelling, R 2002 'Charred and mineralised plant remains', in Poore, D, Thomason, D, and Brossler, A, 'Iron Age Settlement and Roman Activity at Brickley Lane, Devizes, Wiltshire, 1999', *Wilts Archaeol Nat Hist Mag*, **95**, 231–235
- [Pelling, R 2013 *Assessment of macroscopic plant remains and charcoal from Chester Amphitheatre excavations 2004 to 2006: Pre-Roman Phases 1–3* (unpublished report for English Heritage (now Historic England)]
- Pelling, R, Campbell, G, Carruthers, W, Hunter, K and Marshall, P 2015 'Exploring contamination (intrusion and residuality) in the archaeobotanical record: case studies from central and southern England', *Veg Hist Archaeobot*, **24**, 85–99
- Peña, J T 2007 *Roman pottery in the archaeological record* (Cambridge: Cambridge University Press)
- Perring, D 2002 *The Roman house in Britain* (Oxford: Routledge)
- Petch, D F 1968 'The praetorium at Deva', *J Chester Archaeol Soc*, NS **55**, 1–5
- Petch, D F 1987 'The Roman period' in Harris, B E and Thacker, A T (eds) *Victoria History of the County of Chester, vol 1*, 115–236 (Oxford: Oxford University Press)
- Petch, D F 1996 'Filling the gaps – a decade of growth: 1962–73' in Carrington, P (ed) 1996, 57–72
- [Petch, D F unpublished 'Prehistoric/early R-B cultivation', Unpublished archive report section, Frodsham Street]
- Pfuhl, E. and Möbius, H 1977 *Die ostgriechischen Grabreliefs*, (Mainz am Rhein: Philipp von Zabern)
- Philpott, R 1998 'New evidence from aerial reconnaissance for Roman military sites in Cheshire', *Britannia*, **29**, 341–52
- Philpott, R 2010 The Iron Age, in Philpott and Adams, 169–186
- Philpott, R and Adams, M H 2010 *Irby, Wirral Excavations on a Late Prehistoric, Romano-British and Medieval Site, 1987–96* (Liverpool: National Museums of Liverpool)
- Pichot, A 2012 *Les Édifices de Spectacle des Maurétaines Romaines, Archéologie et Histoire Romaine*, **22** (Montagnac: Editions Monique Mergoil)
- Picon, M, Thirion-Merle, V and Vichy, M 2008 'Les verres au natron et les verres aux cendres du Wadi Natrun (Égypte)', *Bulletin de l'Association Française pour l'Archéologie du Verre*, 36–41
- Pitts, L F and St Joseph, J K, 1986 *Inchtuthil, the Roman legionary fortress*, *Britannia Monograph*, **6** (London: Roman Soc)
- Platz-Horster, G 1987 *Die antiken Gemmen aus Xanten im Besitz des Niederrheinischen Altertumsvereins, des Rheinischen Landesmuseums Bonn, der Katholischen Kirchengemeinde St. Viktor und der Regionalmuseums Xanten* (Bonn: Rheinisches Landesmuseum)
- Platz-Horster, G 2010 'Kleine Praser and Chromium-bearing Chalcedonies. About a small group of engraved gems', *Pallas*, **83**, 179–202
- Polak, M 1990–1 'Some observations on the chronology of form 29', *Annales de Pegasus*, **1**, 64–7
- Polak, M, Niemeijer, R and van der Linden, E 2012 'Alphen aan den Rijn-Albaniana and the dating of the Roman forts in the Rhine delta', in Bird (ed) 2012. 267–94

- Poole, C 2005 'The daub and fired clay and briquetage' <http://www.arch.ox.ac.uk/files/Research%20Projects/Hillforts/Segsbury/daubreport.pdf>, accessed 30/9/2015
- Poole, C 2007 'Structural clay and ceramic building material', in Timby, J, Brown, R, Hardy, A, Leech, S, Poole, C and Webley, L, *Settlement on the Bedfordshire Claylands: archaeology along the A421 Great Barford Bypass*, Beds Archaeol Monogr, **8**, (Oxford: Oxbow Books), 265–78
- Poole, C 2010 'Structural daub and fired clay', in Philpott and Adams 2010, 141–8
- Precious, B 2014 'The oxidised wares', in Darling, M and Precious, B, *A corpus of Roman pottery from Lincoln*, Lincoln Archaeological Studies, **6** (Oxford: Oxbow Books), 50–81
- Preston, P R 2009 'Cache and Carry: Lithic Technology and Mesolithic Mobility'. *Internet Archaeology* 26: http://intarch.ac.uk/journal/issue26/preston_toc.html
- Preston, P R 2013 'Bones, Stones or Ethnography? Challenging the Mesolithic Mobility Models for Northern England', in Preston, P R and Schörlke, K. (eds) *Mobility, Transition and Change in Prehistory and Classical Antiquity: Proceedings of the Graduate Archaeology Organisation Conference on the Fourth and Fifth of April 2008 at Hertford College, Oxford, UK*, 29–48. BAR Int Ser, 2534, (Oxford: Brit Archaeol Reps)
- Price, J 1989 'The glass', in Frere 1989, 193–202
- Price, J 2002 Two vessels from Llandoverly, Carmarthenshire, and Piercebridge; County Durham: a note on Flavian and later polychrome mosaic glass in Britain. In: Aldhouse-Green, M and Webster, P (eds) *Artefacts and archaeology – aspects of the Celtic and Roman World* (Cardiff: University of Wales)
- Price, J and Cottam, S 1998 *Romano-British glass vessels: a handbook*. CBA Practical handbook in Archaeology, **14** (York: Council for British Archaeology)
- Price, J and Worrell, S 2007 'Glass', in Hanson 2007, 445–56
- Pringle, S 2006 'Early box flue tiles in London', *London Archaeol*, **11** (5), 124–9
- Prummel, W and Frisch, H-J 1986 'Guide for the Distinction of Species, Sex and Body Size in Bones of Sheep and Goat', *J Archaeol Sci*, **13**, 567–577
- Pryce, T D 1926 'Terra sigillata or samian ware', in Wheeler, R E M, *The Roman fort near Brecon. Y Cymrodor*, **36** (London: Society of Cymmrodorion), 123–213
- Pryce, T D (with Oswald, F) 1928 'A: the samian pottery', in Wheeler and Wheeler 1928, 172–88
- Rackham, H (Trans) 1968 *Pliny: Natural History, Books 33–35* (Cambridge, Mass: Loeb Classical Library)
- Radice, B 1969 *Pliny: Letters* (Cambridge, Mass: Loeb Classical Library)
- Radley, J and Mellars, P 1964 A Mesolithic Structure at Deepcar, Yorkshire, England, and the Affinities of its Associated Flint Industries. *Proc Prehist Soc*, **30**, 1–24.
- Rehren, T and Kraus, K 1999 'Cupel and crucible: the refining of debased silver in the Colonia Ulpia Traiana, Xanten', *J Roman Archaeol*, **12** (i), 263–72
- Reimer, P J, Baillie, M G L, Bard, E, Bayliss, A, Beck, J W, Blackwell, P G, Bronk Ramsey, C, Buck, C E, Burr, G S, Edwards, R L, Friedrich, M, Grootes, P M, Guilderson, T P, Hajdas, I, Heaton, T J, Hogg, A G, Hughen, K A, Kaiser, K F, Kromer, B, McCormac, G, Manning, S, Reimer, R W, Remmele, S, Richards, D A, Southon, J R, Talamo, S, Taylor, F W, Turney, C S M, van der Plicht, J, and Weyhenmeyer, C E, 2009, INTCAL09 and MARINE09 radiocarbon age calibration curves, 0–50,000 years cal BP, *Radiocarbon*, **51**(4), 1111–50
- Renzel, P 2007 'Der Arenaboden des Amphitheaters von Augst-Neum Tüme. Geoarchäologische Untersuchungen', in Hufschmid (2007) 569–76
- Rheinisches Landesmuseum Trier 1984 Trier, Kaiserresidenz und Bischofssitz (Mainz: von Zabern)
- Richardson, B 2008 'An early 2nd-century AD ceramic assemblage', in Bateman *et al* 2008, 134–5
- Ricken, H and Fischer, C 1963 *Die Bilderschüsseln der römischen Töpfer von Rheinzabern. Textband mit Typenbildern zu Katalog VI der Ausgrabungen von Wilhelm Ludowici in Rheinzabern 1901–1914, Materialien zur römisch-germanischen Keramik*, **7** (Bonn: Rudolf Habelt Verlag)
- Robinson, D J 2005 'Reconstruction of the inscription RIB 463' in Mason 2005, 103–5
- Robinson, D J and Ward, T E 1975 'Excavations on the site of the Chester Telephone Exchange extension, 1970–1', *J Chester Arch Soc*, **58**, 41–6
- Robinson, H R 1975 *The armour of Imperial Rome*. (London: Arms and Armour Press)
- Rogers, G B 1974 *Poteries sigillées de la Gaule centrale, I: les motifs non figurés*, Gallia, suppl **28** (Paris: Centre National de la Recherche Scientifique)
- Rogers, G B 1999 *Poteries sigillées de la Gaule centrale: 2 vols* (Lezoux : Laboratoire Céramologique de Lezoux)
- Rolfe, E N 1899 *Pompeii popular and practical: an easy book on a difficult subject*, 3rd edn (Naples: Emil Press)
- Romeuf, A-M 2001 *Le quartier artisanale gallo-romain des Martres-de-Veyre* (Puy-de-Dôme), (*Centre Archéologique de Lezoux*)
- Rova, E 2014 'Tannurs, tannur concentrations and centralised bread production at Tell Beydar and elsewhere: an overview', in Milano, L (ed), *Paleonutrition and food practices in the ancient Near East: towards a multidisciplinary approach*, History of the Ancient Near East/Monographs, **14**, SARGON (Padova: Editrice e Libreria) 121–70
- Royle, R and Woodward, A 1993 'The Prehistoric pottery' in Ellis 1993
- Salisbury, E 1961 *Weeds and Aliens*, The New Naturalist, (London: Collins)
- Samuel, D 2002 'Bread in archaeology. Pain, fours et foyers des temps passés', *Civilisations*, **49**, 1–2, 27–36. <http://civilisations.revues.org/1353>, accessed 30/11/2015
- Schädler, U 1994 Latrunculi – Ein verlorenes strategisches Brettspiel der Römer, *Homo Ludens*, **4** (Salzburg: Institut für Spielforschung und Spielpädagogik)
- Schärlig, A 2006 *Compter du bout des doigts: cailloux, jetons et bouliers, de Périclès à nos jours*, (Lausanne: Les presses polytechniques et universitaires romandes)
- Scheffer, C 2014 'Cooking stands and braziers in Greek sanctuaries', *Opuscula: annual of the Swedish Institutes at Athens and Rome*, **7**, 175–83
- Schmid, E 1972 *Atlas of Animal Bones* (Amsterdam: Elsevier)
- Schmotz, K, 2006 'Das hölzerne Amphitheater von Künzing, Lkr. Deggendorf. Kenntnisstand und erste Rekonstruktionsansätze nach Abschluss der Geländearbeiten im Jahr 2004', Vorträge des 24. Niederbayerischen Archäologentages (Rahden/Westf.), 95–118
- Schweingruber, F H 1978 *Microscopic Wood Anatomy: Structural variability of stems and twigs in recent and subfossil woods*

- from Central Europe. 2nd edn, (Biremsdorf: Swiss Federal Institute of Forestry Research)
- Scott, E M 2003 'The third international radiocarbon inter-comparison (TIRI) and the fourth international radiocarbon intercomparison (FIRI) 1990–2002: results, analyses, and conclusions', *Radiocarbon*, **45**, 135–408
- Scott, E M, Cook G, and Naysmith, P 2010 'The fifth international radiocarbon intercomparison (VIRI): an assessment of laboratory performance in stage 3', *Radiocarbon*, **53**, 859–65
- Seetah, K 2006 'A multidisciplinary approach to cattle butchery', in Maltby, M (ed) *Integrating Zooarchaeology* (Oxford: Oxbow Books), 111–118
- Sena Chiesa, G 1966 *Gemme del Museo Nazionale di Aquileia*. (Associazione nazionale per Aquileia)
- Shackleton-Bailey, D R (ed and trans) 1993 *Martial: Epigrams, vol 1: Spectacles, Books 1–5* (Cambridge, Mass: Loeb Classical Library)
- Sharples, N, Evans, C, Slater, A, Payne, A, Linford, P and Linford, N, 'Ham and Mustard', *British Archaeology*, March–April 2012, 34–39
- Shepherd, J 1992 The glass. In: Cowan, C 'A possible mansio in Roman Southwark: excavations at 15–23 Southwark Street, 1980–86. *Trans London & Middlesex Archaeol Soc* **43**, 3–191
- Shepherd, W 1972 *Flint. Its Origins, Properties and Uses* (London: Faber and Faber)
- Shone, W 1911, *Prehistoric Man in Cheshire* (Simpkin, Marshall, Hamilton, Kent: London)
- Shortland, A 2002 'The use and origins of antimonate colourants in early Egyptian glass', *Archaeometry*, **44**, 517–30
- Shortland, A J and Eremin, K 2006 'The analysis of second millennium glass from Egypt and Mesopotamia, part 1: new WDS analyses', *Archaeometry*, **48** (4), 581–603
- Shotter, D 1998 'Appendix 2: Roman coins from Holt' in Ward, M, 'Some finds from the Roman works-depôt at Holt', *Stud Celtica*, **32**, 68–72
- Shotter, D C A 1999 'Chester – early Roman occupation' in Carrington, P (ed) *Deva Victrix: Roman Chester re-assessed* (Chester: Chester Archaeol Soc), 25–31
- Shotter, D C A 2000a *Roman Coins from North-West England: Second Supplement*, Lancaster
- Shotter D C A 2000b 'Petillius Cerialis in Northern Britain', *Northern History*, **36**, 189–98
- Shotter, D C A 2001 'Petillius Cerialis in Carlisle: A Numismatic Contribution', *Trans Cumberland Westmorland Antiq Archaeol Soc*, 3 ser, 1, 21–9
- Sidall, R 2000 *Lime cements, plasters, mortars and concretes*, <http://www.ucl.ac.uk/~ucfbxrs/limes/G123notes.htm>, accessed 10/9/2015
- Sidall, R 2006 "'Not a day without a line drawn": Pigments and painting techniques of Roman artists', *In focus*, **2**, 18–31
- Silver, I A 1969 'The ageing of domestic animals', in Brothwell, and Higgs (eds) 1969, 283–302
- Sim, D 1997 'Roman chain-mail: experiments to reproduce the techniques of manufacture', *Britannia*, **28**, 359–371
- Sim, D 2012 *The Roman iron industry in Britain* (Stroud: History Press)
- Simetric, 2016 http://www.simetric.co.uk/si_materials.htm
- Simpson, G 1968 'The samian pottery', in Hogg, A H A, 'Pen Llystyn: a Roman fort and other remains', *Arch J*, **125**, 161–70
- Slota Jr, P J, Jull, A J T, Linick, T W and Toolin, L J, 1987 Preparation of small samples for 14C accelerator targets by catalytic reduction of CO, *Radiocarbon*, **29**, 303–6
- Smart R, 1993 'The Flint', in Ellis 1993, 56–59
- [Smith, I 2001 'Animal bone' in Garner, D 2001, 11–17]
- Sparkes, B A 1962 'The Greek kitchen', *J Hellenistic Studs*, **82**, 121–37
- Sparkes, B A 1965 'The Greek kitchen: addenda', *J Hellenistic Studs*, **85**, 162–3
- Spataro, M and Villing, S 2015 *Ceramics, cuisine and culture: the archaeology and science of kitchen pottery in the ancient Mediterranean world* (Oxford: Oxbow Books)
- Stace, C 1997 *New Flora of the British Isles* (2nd ed) (Cambridge: Cambridge University Press)
- Stace, C 2010 *New Flora of the British Isles* (3rd ed) (Cambridge: Cambridge University Press)
- Stanfield, J A 1926 'Samian ware', in White, G M, 'The Chichester amphitheatre: preliminary excavations', *Antiqs J*, **16**, 158–59
- Stanfield, J A 1929 'Unusual forms of terra sigillata', *Archaeol J*, **86**, 113–151
- Stanfield, J A 1935 'A samian bowl from Bewcastle', *Trans Cumberland Westmorland Antiq Archaeol Soc* (NS), **35**, 182–205
- Stanfield, J A 1936 'Unusual forms of terra sigillata second series', *Archaeol J*, **93**, 101–116
- Stanfield, J A and Simpson, G 1958 *Central Gaulish potters* (Oxford: Oxford Univ Press)
- Stanfield, J A and Simpson, G 1990 *Les potiers de la Gaule centrale*, *Revue Archéologique Sites* (Hors-série **37**), Gonfaron
- Stanford S C, 1991 *The Archaeology of the Welsh Marches*. 2nd edition (Hereford)
- Stenhouse, M J and Baxter, M S 1983 '14C reproducibility: evidence from routine dating of archaeological samples', *PACT* **8**, 147–61
- Stevens, C 2003 'An investigation of agricultural consumption and production models for prehistoric and Roman Britain', *Environmental Archaeology* **8.1**, 61–76
- Stevens, C 2006 'Charred plant remains' p 55–58 in Leivers, M, Chisham, C, Knight, S and Stevens, C 'Excavations at Ham Hill Quarry, Ham Hill, Montacute, 2002' *Somerset Archaeology and Natural History*, **149**, 39–62
- Stevens, C 2007 'Environmental remains' in Evans, C, Knight, M and Webley, L (eds) 'Iron Age settlement and Romanisation on the Isle of Ely: the Hurst Lane Reservoir site', in *Proc Camb Antiq Soc*, **96**, 60–62
- Strahan, A 1882 *Geology of the neighbourhood of Chester (Old Series Quarter Sheet 80 SW)*, Mem Brit Geol Surv, (London: HMSO)
- Strickland, T J 1982 'Chester: excavations in the Princess Street/Hunter Street area 1978–82. A first report on discoveries of the Roman period', *J Chester Archaeol Soc*, NS **65**, 5–24
- Strickland, T J 1994 'The survival of Roman Chester, an overview' in Ward, S 1994, 5–17
- Strickland, T J 1996 'Recent research at the Chester legionary fortress: the curtain wall and the barrack verandah colonnades, in P Johnson and I Haynes, *Architecture in Roman Britain*, CBS Res Rep **94** (York: CBA), 104–9
- Strickland, T J 1999 'What kind of community existed at Chester during the hiatus of the 2nd century', in A Goldsworthy and I Haynes, *The Roman Army as a Community*, J Roman Archaeol Supp Ser, **34** (Portsmouth, Rhode Island: JRA), 105–11

- Stuiver, M and Kra, R S 1986 Editorial comment, *Radiocarbon*, **28(2B)**, ii
- Stuiver, M and Polach, H A 1977 Reporting of ^{14}C data, *Radiocarbon*, **19**, 355–63
- Stuiver, M and Reimer, P J 1986 A computer program for radiocarbon age calculation, *Radiocarbon*, **28**, 1022–30
- Stuiver, M and Reimer, P J 1993 Extended ^{14}C data base and revised CALIB 3.0 ^{14}C age calibration program, *Radiocarbon*, **35**, 215–30
- [Summers, J forthcoming *Charred plant remains from two four post structures from Stanwick, Northamptonshire: preliminary results and recommendations for further study*, English Heritage Research Report 38/2013]
- Sunter, N J 1976 'Architectural reconstruction of the Chester amphitheatres', in Thompson 1976, 222–236
- Sunter, N 1989 'Observations on the reconstruction of the amphitheatre' in Fulford 1989, 161–76
- Sutherland, C H V 1937 *Coinage and Currency in Roman Britain*, (Oxford: Oxford University Press)
- Swan, V G 1984 *The pottery kilns of Roman Britain*, RCHM suppler, **5**, (London: HMSO)
- Swan, V G 1992 'Legio VI and its men: African legionaries in Britain' *J Roman Pottery Studies*, **5**, 1–33
- Swan, V G 1997 'Vexillations and the garrisons of Britannia in the second and early third centuries', in Groenmann-van Waateringe, W, van Beek, B L, Willems, W J H, and Wynia, S L (eds), *Roman Frontier Studies 1995* (Oxford: Oxbow Books) 289–94
- Swann, V G 1999 'Legio XX Valeria Victrix and the Antonine Wall: new perspectives in the history of northern Britain' in Gudea, N (ed), *Roman Frontier Studies 1997: Proceedings of the XVIIth International Congress of Roman Frontier Studies*, (Zalau: Salaj Museums) 539–45
- Swan, V 2008 'Builders, suppliers and supplies in the Tyne-Solway region and beyond', in Bidwell, P (ed) *Understanding Hadrian's Wall: papers from a conference held at South Shields, 3–5 November 2006, to mark the publication of the 14th edition of the Handbook of the Roman wall*, (South Shields: Arbeia Society)
- Swan, V, McBride, R M and Hartley, K F 2009 'The coarse pottery (including amphorae and mortaria), in Howard-Davis 2009, 566–660
- Swan, V G and Philpott, R A 2000 'Legio XX VV and tile production at Tarbock, Merseyside', *Britannia*, **31**, 55–67
- Sworn, S 2009 'News from the County: The Butts Dig update'. *Worcestershire Recorder* **80**, Autumn 2009. Newsletter of the Worcestershire Archaeological Society, 6–7
- Sworn, S, Dalwood, H, Evans, C J and Pearson, E 2014 *Archaeological excavation at the City Campus, University of Worcester*, Worcestershire Archaeology Res Rep, **2** (Worcester: Wores. CC)
- Symons, M 2004 *A history of cooks and cooking*. (Champaign: University of Illinois Press)
- Symonds, M A 2015 'Fourth century fortlets in Britain: sophisticated systems or desperate measures', in Collins, R, Symonds, M and Weber, M (eds) *Roman military architecture on the frontiers: Armies and their architecture in late antiquity* (Oxford: Oxbow Books), 46–61
- Taller Escola D'Arqueologia 1990 *L'Amfiteatre Romà de Tarragona, La Basílica Visigòtica I, L'església Romànica, Memòries D'Excavació*, **3** (Tarragona: Ajuntament de Tarragona)
- Teichert, M 1975 'Osteometrische Untersuchungen zur Berechnung der Widerristhöhe bei Schafen', in Clason, A T (ed), *Archaeozoological Studies*, (Amsterdam: Elsevier), 51–69
- [Terra Nova 2003 *A report on the deposits at Chester Roman amphitheatre, 18th August 2003*, Terra Nova Ltd]
- Terrisse J-R, 1968 *Les céramiques sigillées gallo-romains des Martres-de-Veyre* (Puy-de-Dôme), *Gallia Suppl*, **19**, (Paris: Centre National de la Recherche Scientifique)
- Thieren, E, Wouters, W and Van Neer, W 2012 'Body length estimation of the European eel *Anguilla anguilla* on the basis of isolated skeletal elements', *Cybium*, **36**, 551–562
- Thompson, F H 1962a 'The legionary fortress of Deva (Chester): recent discoveries', in Renard, M (ed), *Hommages à Albert Grenier*, Collections Latomus, **58**, 1491–1500
- Thompson, F H 1962b 'Infirmary Field excavation, 1957', *J Chester Archaeol Soc*, **49**, 1–3
- Thompson F H 1971 *The Roman amphitheatre at Chester* (Edinburgh: Dept of Environment)
- Thompson, F H 1974 'The amphitheatre of the legionary fortress of Deva (Chester): excavations 1965–69' in Pippidi, D M (ed) *Actes du IXe congrès internationale d'études sur les frontières Romaines*, Mamaia, 6 – 13 Sept 1972 (Bucharest: Editions Academiei), 355–61
- Thompson, F H 1976 'Excavation of the Roman Amphitheatre at Chester', *Archaeologia*, **105**, 127–239
- Thompson, F H 1996 'The education of an archaeologist in a time of change: 1955–62' in Carrington, P (ed) 1996, 49–56
- Thompson, F H 1997 'The Roman Inscription from the Old Market Hall Site, Chester', *Antiqs J*, **77**, 371–5
- Tilhard, J-L and Bouquillon, A 2009 *Les céramiques sigillées d'Espalion: (Aveyron – France): localisation de l'atelier, productions, diffusion, Aquitania Suppl*, **16**; *Documents d'archéologie et d'histoire périgourdines Suppl*, **4** (Perigueux: ADRAHP)
- Timby, J 1989 'The pottery' in Fulford 1989, 80–101
- Timby, J 2012 'The Roman pottery' in Cuttler *et al* 2012, 28–65
- Tkáčová, L 2013 *Near Eastern tannurs now and then: a close-up view of bread ovens with respect to the archaeological evidence and selected ethnographic examples from Khabur region*, is.muni.cz/th/362654/ff_b/BAKALARSKA_PRACA_Lenka_Tkacova_2013.pdf, accessed 25/6/2014
- Tomber, R and Dore, J 1998 *The national Roman fabric reference collection a handbook*, (London: Museum of London Archaeology Service)
- Tomlin, R S O 2002 'Graffiti', in Wilson 2002, 504–17
- Tomlin, R S O 2014 'III Inscriptions, B. Instrumentum domesticum' in 'Roman Britain in 2013', *Britannia*, **45**, 438–55
- Tomlin, R S O, Wright, R P and Hassall, M W C 2009 *The Roman Inscriptions of Britain Volume III, Inscriptions on stone, 1955–2006*, (Oxford: Oxbow Books)
- Topping, P 1989a 'The context of cord rig cultivation in later prehistoric Northumberland, in Bowden, M, Mackay, D and Topping, P (eds), *From Cornwall to Caithness: some aspects of British field archaeology*, BAR Brit Ser **209**, (Oxford: Archaeopress) 145–57
- Topping, P 1989b 'Early cultivation in Northumberland and the Borders', *Proc Prehist Soc*, **55**, 161–79
- Toynbee, J M C 1973, *Animals in Roman Life and Art* (London: Thames and Hudson)

- Travel China Guide* 2016 www.travelchinaguide.com/china-trains/seat-size
- Tsoukala, V 2009 'Cereal processing and the performance of gender in archaic and classical Greece: iconography and function of a group of terracotta statuettes and vases' in Aygün, C O (ed), *SOMA 2007, proceedings of the XI symposium on Mediterranean archaeology, Istanbul Technical University, 24–29 April 2007*, BAR Int Ser, **1900** (Oxford: Archaeopress), 387–95
- Turner, W E S 1956 'Studies in ancient glasses and glassmaking processes; part V, raw materials and melting processes', *Glass Technology*, **40**, 277–300
- Turner, W E S and Rooksby, H P 1959 'A study of the opalising agents in ancient glasses throughout three thousand four hundred years', *Glastechnische Berichte*, **32K VIII**, 17–28
- Tuset, F, de la Iglesia, M A, and Elkin, M 2009 'Clunia: Roman failure, archaeological marvel', *Current World Archaeol*, **32**, 18–25
- Tyers, P 1993 'The plain samian ware', in Manning, W H, *Report on the excavations at Usk 1965–1976. The Roman pottery* (Cardiff: Univ Wales Press), 125–60
- Tyers, P 1996 *Roman pottery in Britain* (London: Batsford)
- University of Leicester 2014 *University of Leicester archaeologists discover bronze remains of Iron Age chariot*, <http://www2.le.ac.uk/offices/press/press-releases/2014/october/university-of-leicester-archaeologists-discover-bronze-remains-of-iron-age-chariot>.
- Van Beek, B and Depauw, M 2013 'Quantifying imprecisely dated sources. A new inclusive method for charting diachronic change in Graeco-Roman Egypt', *Ancient Society*, **43**, 101–14
- Vandeputte, K, Moens, L, and Dams, R 1996 Improved sealed-tube combustion of organic samples to CO₂ for stable isotope analysis, radiocarbon dating and percent carbon determinations, *Analytical Letters*, **29**, 2761–73
- Van den Dries, F MA 2006a *Een zeldzame glazen koepel uit de Romeinse thermen te Heerlen*. <http://www.landvanherle.nl/editie/2006/200603.pdf>. Accessed 22 April 2016
- Van den Dries, F MA 2006b 'A rare domed windowpane fragment from the Roman baths in Heerlen. *J Glass Studies* **48**, 327–29
- Van der Veen, M 1992 *Crop Husbandry Regions: An Archaeobotanical Study of Farming in Northern England, 1000 BC–AD 500*, Sheffield Archaeological Monographs **3**, (Sheffield: JR Collis Publications)
- Van der Veen, M 1999 'The economic value of chaff and straw in arid and temperate zone' in *Vegetation History and Archaeobotany*, **8**, 211–224
- Van der Veen, M and Jones, G 2005 'A re-analysis of agricultural production and consumption: implications for understanding the British Iron Age', *Vegetation History and Archaeobotany*, **15**, 217–228
- Van der Veen, M and Palmer, C 1997 'Environmental factors and the yield potential of ancient wheat crops' *Journal of Archaeological Science*, **24**(2) 163–182.
- Van der Veen, M, Livarda, A and Hill, A 2008 'New plant foods in roman Britain', *Environmental Archaeology*, **13**.1, 7–50
- Van Neer, W, Ervynck, A and Monsieur, P 2010 'Fish bones and amphorae: evidence for the production and consumption of salted fish products outside the Mediterranean region', *J Roman Archaeol*, **23**, 161–195
- Varley, W J 1950 'Excavations of the castle ditch, Eddisbury, 1935–1938', *Trans Hist Soc Lancs and Chesh*, **102**, 1–68
- Varley, W J 1964 *Cheshire before the Romans: a history of Cheshire, 1*, (Chester: Cheshire Community Council)
- Vernhet, A 1986 'Centre de production de Millau atelier de La Graufesenque', in Bémont and Jacob 1986, 96–103
- Vismara, C and Caldelli, M L 2000 *Epigrafia Anfiteatrale Dell'Occidente Romano V, Alpes Maritime, Gallia Narbonensis, Tres Galliae, Germaniae, Britanniae, Vetera*, **14** (Roma: Edizione Quasar)
- Van der Waals, J D 1954 Review of Ettlinger and Simonett 1952, *Antiquity*, **28**, 246–7
- Van Neer, W, Ervynck, A and Monsieur, P 2010 'Fish bones and amphorae: evidence for the production and consumption of salted fish products outside the Mediterranean region', *J Roman Archaeol*, **23**, 161–195
- von den Driesch, A 1976 *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Peabody Museums Bulletin **1**, Peabody Museum of Archaeology and Ethnology, Cambridge Mass., Harvard University
- Von Groller, M 1900 'Romische Waffen', *Romische Limes in Osterreich*, **2**, 85–132
- Vogel, J S, Southon, J R, Nelson, D E and Brown, T A 1984 Performance of catalytically condensed carbon for use in accelerator mass-spectrometry, *Nuclear Instruments and Methods in Physics Research B* **233**, 289–93
- Vries, Hessel de, and Barendsen, G W 1952 A new technique for the measurement of age by radiocarbon: *Physica* **18**, 652
- [Wain, I 2002 *Chester Amphitheatre: Resource assessment and research agenda (Oxford Archaeology)*]
- Walker, A O 1893 'The fisheries of Flintshire and Denbighshire', *Procs Liverpool Biol Soc*, **7**, 1–14
- Walters, H B 1926 *A catalogue of the engraved gems, Greek, Etruscan and Roman in the British Museum* (London: British Museum)
- Walthew, C V 1978 'Property boundaries and the sizes of building plots in Roman towns', *Britannia*, **9**, 335–50
- Walthew, C V 1981 'Standard units of measurement in Roman military planning', *Britannia*, **12**, 15–36
- Ward, C 1999 *Iron Age and Roman Piddington: the Roman ceramic and stone building materials 1979–1998*, (Piddington: Upper Nene Archaeol Soc)
- Ward, G K and Wilson, S R 1978 Procedures for comparing and combining radiocarbon age determinations: a critique, *Archaeometry*, **20**, 19–32
- Ward, M (née Bulmer) 1981 'Terra nigra-type wares from Chester' in Anderson, A C and Anderson A S (eds) *Roman pottery research in Britain and north-west Europe. Papers presented to Graham Webster Part I*, BAR Int Ser, **123** (i), (Oxford: Brit Archaeol Reps), 51–68
- Ward, M 1989 'The samian ware', in Blockley 1989a, 139–154
- Ward, M 1998 'Some finds from the Roman works-depôt at Holt', *Studia Celtica*, **32**, 43–84
- Ward, M 2005 'A collection of samian ware found close to the first bridge at Piercebridge', *J Roman Pottery Studs*, **12**, 179–83
- Ward, M 2008a 'Samian ware' in Williams and Reid 2008, 117–158
- Ward, M 2008b 'The samian ware', in Cool, H E M and Mason, D J P (eds) *Roman Piercebridge: Excavations by D W Harding and Peter Scott 1969 – 1981*, Archit Archaeol Soc Durham Northumberland Res Rep, **7**, 169–296 (For catalogue and summaries by site: http://archaeologydataservice.ac.uk/archives/view/piercebridge_ch_2008/downloads.cfm)

- Ward, M 2008c 'Samian', in Garner, D *et al* 2008, 164–67
- Ward, M 2009a, 'The samian', in Howard-Davis 2009, 539–56
- Ward, M 2009b The samian ware, from Buckley's Field, Middlewich Community Dig Project. <http://www.middlewich-heritage.org.uk/finds/>, accessed 31/10/ 2017
- Ward, M 2011 'Samian ware from northern Britain: models of supply, demand and occupation', in Saunders, T (ed), *Roman north west England: hinterland or 'Indian country'?*, Archaeol North-West, new ser, **2**, 74–104
- Ward, M 2012a 'A northern odyssey: the first 26,000 samian vessels, and still counting', in Bird, (ed) 1998, 19–27
- Ward, M 2012b 'Samian', in Ward, S W *et al* 2012, *passim*
- Ward, M 2015 'A gazetteer of the incidence of less common samian ware fabrics and products in northern and western Britain. Part 1: Introduction and South Gaulish fabrics', *J Roman Pottery Studies*, **16**, 131–55
- Ward, M 2016 'Samian', in Zant, J 2016 'Excavations on a Roman Salt-working Site at Jersey Way, Middlewich, Cheshire', *Archaeol J*, **173**, 88–99
- Ward, M forthcoming, a 'A gazetteer of the incidence of less common samian ware fabrics and products in northern and western Britain. Parts 2–3', *J Roman Pottery Studies*
- Ward, M forthcoming, b 'The samian ware', in Howard-Davis, C, Miller, I, Hair, N and Newman, R M, forthcoming, *Excavations at Mitchells Brewery, and 39 Church Street, Lancaster*, Lancaster Imprints (Lancaster: Oxford Archaeology North)
- Ward, M forthcoming, c 'Samian ware from three locations at Brougham', in Zant, J, *The Roman extramural settlement at Brougham: the excavations of 2007–8*, Lancaster Imprints (Lancaster: Oxford Archaeology North)
- Ward, S W 1994 *Excavations at Chester: Saxon occupation within the Roman fortress: Sites excavated 1971–1981*, Chester Excavation and Survey Rep, **7** (Chester: Chester CC)
- Ward, S W 2009 *Chester: a history* (Chichester: Philimore)
- Ward, S W 2012 'The development of the river channel', in Ward, S *et al* 2012, 260–263
- Ward, S W and Strickland, T J 1978 *Chester Excavations: Northgate Brewery 1974/5 – a Roman centurion's quarters and barrack* (Chester: Chester City Council)
- Ward, S W *et al* 2012 *Excavations at Chester: the western and southern Roman extramural settlements: a Roman community on the edge of the world – excavations 1964–1989 and other investigations*, Chester Archaeology excavation and survey report, **15**, BAR Brit Ser, **533** (Oxford: Archaeopress), 338–415
- Warry, P 2006a *Tegulae: Manufacture, typology and use in Roman Britain*, BAR Brit Ser, **417**, (Oxford: Archaeopress)
- Warry, P 2006b 'A dated typology for Roman roof tiles (*tegulae*)', *J Roman Archaeol*, **19**, fasc 1, 246–65
- Warry, P 2010 'Legionary tile production in Britain', *Britannia*, **41**, 127–47
- Watkin, W T 1886 *Roman Cheshire* (Liverpool)
- Weaver, O J 1976 'Chester Roman amphitheatre: conservation and display' in Thompson 1976, 236–239
- Webster, G 1989 'Deities and religious scenes on Romano-British pottery', *J Roman Pottery Studies*, **2**, 1–28
- Webster, J and Webster, P 2012 "'Is your figure less than Greek?'" Some thoughts on the decoration of Gaulish samian ware', in Bird (ed) 2012, 195–215
- Webster, J and Webster, P 2013 'Classical figures in a provincial landscape. A study in the iconography of samian', in Fulford and Durham (eds) 2013, 340–348
- Webster, P V 1976 'Severn Valley ware: a preliminary study', *Trans Bristol Gloucester Archaeol Soc*, **94**, 18–46
- Webster, P V 1982 'Romano-British coarse pottery in north-west England – an introduction', *Lancashire Archaeol J*, **2**, 13–31
- Webster, P V 1993 'Coarse pottery' in P J Casey and J L Davies with J Evans, *Excavations at Segontium (Caernarfon) Roman Fort 1975–1979*, CBA Res Rep 90 (York: Council for British Archaeology), 250–316
- Webster, P V 1996 *Roman samian pottery in Britain*, Practical Handbook in Archaeology, **13** (York: CBA)
- Webster, P V 2001 'Earth, fire and water: the making and marketing of Roman samian ware', in Higham, N J (ed) *Archaeology of the Roman Empire: a tribute to the life and works of Professor Barri Jones*, BAR Int Ser, **940** (Oxford: Archaeopress), 289–300
- Webster, P V 2006 'Some smaller moulded samian forms from La Graufesenque', *Antiqs J*, **86**, 14–35
- Webster, P V 2013 'Samian, soldiers and civilians in Roman Wales', in Fulford and Durham (eds) 2013, 210–223
- Welch, K E 2007 *The Roman Amphitheatre from its origins to the Colosseum* (Cambridge: Cambridge University Press)
- Wessex Archaeol 2006 'England's Historic Seascapes: Liverpool Bay Pilot Area'. Available from <http://archaeologydataservice>.
- Wheeler, A 1981 'Fish bones', in Partridge, C, *Skeleton Green. A Late Iron Age and Romano-British Site*, Britannia Monogr, **2**, 242–3
- Wheeler, R E M and Wheeler, T V 1928 'The Roman amphitheatre at Caerleon, Monmouthshire', *Archaeologia*, **78**, 111–218
- Wild, F 1988 'The samian ware', in Edwards, B J N and Webster, P V, *Ribchester excavations, part 3. Excavations in the civil settlement 1968–1980*, B Pottery and coins (Cardiff: University College), 9–50
- Wild, F 2012 'The samian ware from Cardean and the Flavian occupation of Scotland', *J Roman Pottery Studs*, **15**, 236–48
- Wild, F 2015 'Late Montans decorated samian ware from Scotland and North-West England', *J Roman Pottery Studies*, **16**, 156–79
- Wild, F forthcoming 'Samian ware', in Gibbons, P, Howard-Davis, C, and Olivier, ACH, *Excavations at the Roman site of Walton-le-Dale, 1981–3 and 1996–7* (Lancaster: Oxford Archaeology North)
- [Williams, D 1982 *Petrological analysis of Roman pottery from Chester*, unpub archive report]
- Williams, D F 2010 'Thin-section petrology of late prehistoric pottery and fired clay', in Philpott and Adams 2010, 120–22
- Williams, H P G 2004 *Carausius. A consideration of the historical, archaeological and numismatic aspects of his reign*, BAR Brit Ser, **378** (Oxford: Archaeopress)
- Williams, M and Reid, M 2008 *Salt: life and industry. Excavations at King Street, Middlewich, Cheshire, 2001–2002*, BAR Brit Ser, **456** (Oxford: Archaeopress)
- Williams, W J 1929 'Roman amphitheatre in Ursuline convent school grounds' *J Chester Archaeol Soc* new ser **28** (2), 218–9
- Willis, S 2003 'The character of Lyon ware distribution (with particular attention to the evidence from the Midlands and the north of Britain)', *J Rom Pottery Stud*, **10**, 125–38
- Willis, S (ed) 2004 'The Study Group for Roman Pottery: Research Framework Document for the Study of Roman Pottery in Britain', *J Rom Pottery Stud*, **11**, 1–20
- Willis, S 2005 'Samian pottery, a resource for the study of Roman Britain and beyond: the results of the English Heritage funded

- samian project', *Internet Archaeology* **17** <http://intarch.ac.uk/journal/issue17/1/toc.html>
- Willis, S 2005b 'The context of writing and written records in ink: the archaeology of samian inkwells in Roman Britain', *Archaeol J*, **162**, 96–145
- Willis, S 2011 'Samian ware and society in Roman Britain and beyond', *Britannia*, **42**, 167–242
- Wilmott, T 1991 *Excavations in the Middle Walbrook Valley: City of London, 1927–1960*, London Middlesex Archaeol Soc Special Paper, **13** (London: LAMAS)
- Wilmott, T 1997, *Birdoswald, excavations of a Roman fort on Hadrian's Wall and its successor settlements*, English Heritage Archaeological Report 14 (London: English Heritage)
- [Wilmott, T 2001 *The Chester Amphitheatre: a costing for full excavation*, English Heritage Internal Document]
- [Wilmott, T 2002 *The Chester Amphitheatre: brief for archaeological work*, English Heritage Internal Document]
- [Wilmott, T 2004a *The Chester Amphitheatre Beacon Project: Project Design for excavation 2004–5*, English Heritage Internal Document]
- Wilmott, T 2004b 'The Chester amphitheatre; a beacon project begins', *CfA News*, **8**, 1–3
- [Wilmott, T 2005 *The Chester Amphitheatre Beacon Project: Project Design for excavation 2005*, English Heritage Internal Document]
- Wilmott, T 2007a 'Two left-handed gladiators in Britain' *Antiqs J*, **87**, 141–7
- [Wilmott, T 2007b *The Chester Amphitheatre Beacon Project, Excavations 2004–5: Project Design for Assessment*, English Heritage Internal Document]
- Wilmott, T 2008 *The Roman Amphitheatre in Britain* (Stroud: Tempus)
- Wilmott, T (ed) 2009a *Roman amphitheatres and spectacula: a 21st-century perspective*, BAR International Ser, **1946**, Oxford: Archaeopress
- Wilmott, T 2009b 'The linear elements of the Hadrian's Wall complex; four investigations 1983–2000' in T Wilmott (ed) *Hadrian's Wall; archaeological research by English Heritage 1976–2000*, (Swindon: English Heritage), 72–128
- [Wilmott, T (ed) 2013a *Chester Amphitheatre Project (Excavations 2004–6, Project 3696, Volume 1 Archaeological Assessment*, English Heritage/ CWAC Internal Document]
- [Wilmott, T 2013b *Chester Amphitheatre Project (Excavations 2004–6, Project 3696, Volume 1 Updated Project Design*, English Heritage/ CWAC Internal Document]
- Wilmott, T and Garner, D 2009 'Excavations on the legionary amphitheatres at Chester (Deva), Britain', in Wilmott (ed) 2009a, 63–74
- Wilmott, T and Wilson, P (eds) 2000 *The late Roman transition in the north. Papers from the Roman Archaeology Conference, Durham 1999* BAR Brit Ser, **299** (Oxford: Brit Archaeol Reps)
- Wilmott, T, Garner, D and Ainsworth, S 2006 'The Chester amphitheatre; an interim statement' *English Heritage Hist Rev*, **1**, 7–23
- Wilson, P 2002 *Cataractonium: Roman Catterick and its hinterland. Excavations and research, 1958–1997 Part II*, CBA Res Rep **129** (York: CBA and English Heritage) 213–233
- Wilson Jones, M 1993 'Designing amphitheatres', *Mitteilungen des Deutschen Archäologischen Instituts*, **100**, 391–441
- Wilson Jones, M 2000 *Principles of Roman Architecture* (Yale: London)
- Wilson Jones, M 2009 'The setting out of amphitheatres; ellipse or oval? Questions answered and not answered', in Wilmott 2009a, 5–14
- [Withey, M 2011 *Historic Building Report: Dee House, Little St John Street, Chester* (English Heritage: unpublished report)]
- Wittenberg, T 2014 *Kult bei Arena: Nemesis-Heiligtümer in Kontext römischer Amphitheatre*, BAR Int Ser, **2615** (Oxford: Archaeopress)
- Wright, J A 1929 'Notes on the planning and setting-out of the amphitheatre', in Wheeler and Wheeler 1929, 215–8
- Wright, R P 1976 'Inscriptions' in Thompson 1976, 184–188
- Young, C J 2000 *The Roman pottery industry of the Oxford region*, BAR Brit Ser, **43** (Oxford: Brit Archaeol Reps)
- Zangenmeister, C and Schoene, R 1871 *Corpus Inscriptionum Latinum vol IV: inscriptions parietariae Pompeianae, Herculaneenses, Stabianae* (Berlin)
- Zant, J 2009 *The Carlisle Millennium Project; excavations in Carlisle 1998–2001* vol 1, Lancaster Imprints, **14** (Lancaster: Oxford Archaeol)
- Zeder, M 2006 'Reconciling rates of long bone fusion and tooth eruption and wear in sheep (*Ovis*) and goats (*Capra*)', in Ruscillo, D (ed) *Recent advances in ageing and sexing animal bones*. (Oxford: Oxbow Books) 87–118
- Ziebart, M, Arthur, J, Bateman, N, Rauxloh, P, Lees, D and Brown, J 2007 'Determination of the parameters of the Guildhall amphitheatre ellipse in London', *J Archaeol Sci*, **34**, 1505–14
- Zienkiewicz, J D 1986a *The legionary fortress baths at Caerleon. I: The buildings* (Cardiff: National Museum of Wales/Cadw)
- Zienkiewicz, J D 1986b *The legionary fortress baths at Caerleon. II: The finds* (Cardiff: National Museum of Wales/Cadw)
- Zienkiewicz, J D 1986c 'The engraved gemstones' in Zienkiewicz 1986b, 117–141
- Zohary, D and Hopf, M 1994 *Domestication of Plants in the Old World* (2nd ed) (Cambridge: Cambridge University Press)

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